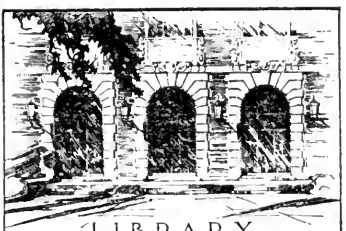

HIGGINS FLAT PUEBLO

WESTERN NEW MEXICO

PAUL S. MARTIN

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FIELDIANA: ANTHROPOLOGY

VOLUME 45

Published by

CHICAGO NATURAL HISTORY MUSEUM

APRIL 6, 1956

FIELDIANA: ANTHROPOLOGY

A Continuation of the

ANTHROPOLOGICAL SERIES

of

FIELD MUSEUM OF NATURAL HISTORY

VOLUME 45

CHICAGO NATURAL HISTORY MUSEUM
CHICAGO, U.S.A.
1956

HIGGINS FLAT PUEBLO

Western New Mexico

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WESTERN NEW MEXICO

PAUL S. MARTIN
Chief Curator, Department of Anthropology

JOHN B. RINALDO
Assistant Curator, Archaeology

ELAINE A. BLUHM
Assistant, Archaeology

HUGH C. CUTLER
Curator of the Museum, Missouri Botanical Garden

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PRINTED IN THE UNITED STATES OF AMERICA
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Preface

A portion of a large pueblo on Higgins Flat about three miles northwest of Reserve, New Mexico, was excavated by our expedition during the season of 1953. Part of the pueblo lies on property owned by Mr. Owen McCarty and the rest on land owned by Mr. Ray Hudson, both of Reserve, New Mexico. We are grateful for their interest and permission to excavate upon their land.

Mr. Stanley Field, President of the Board of Trustees of this Museum, and Colonel Clifford C. Gregg, Director, again generously and interestedly backed our work by their moral encouragement and financial aid. We wish them and the members of our Board of Trustees to know how much we appreciate this magnificent support in helping us continue our researches, which eventually may unravel some of the mysteries concerning the growth and decline of cultures.

We have always been fortunate in securing assistance of able and inspiring people. Without them, we could not operate. We consider it a pleasure to acknowledge our indebtedness to Messrs. Juan J. Armijo; Juan M. Armijo; James Barter, photographer, clerk, and general assistant; E. D. Hester, ceramic statistician; Abe Jiron; Arthur E. Jiron; Julian B. Jiron; Allen Lapiner; David Mabon, cartographer; Bill Menges; Joseph Shaw; Mickey Snyder; Wayne Spurgeon; and Mrs. Martha Perry, our cook.

We are also indebted for professional services to Mr. Robert E. Carey, Ranger, Hood Ranger Station, Apache National Forest; Mrs. Mary Crackel, proprietor, Pine Lawn Tourist Camp; Mr. Clair E. Gurley, Central Motor Company, Gallup; Dr. C. W. Keney, Gallup; Dr. Lester H. Keys, Reserve; Mr. Emil Kiehne, Reserve; Mr. Frank Turner, of Charles Ilfeld Company, Albuquerque; and Mr. Charles Williams, of Gallup Car Parts, Inc., Gallup.

Miss Lillian A. Ross, Associate Editor, Scientific Publications, continued her supervision of our publications.

Miss June Cushing traced the plans and sections; Mr. Gustaf Dalstrom, staff Artist, is responsible for the perspective drawing of Room A and for the drawing showing the construction of textiles;

Dr. Fritz Haas, Curator of Lower Invertebrates, identified the shell; Miss Agnes McNary, secretary of the Department of Anthropology, typed the manuscript and the sherd tables and compiled the index; Miss Phyllis Wade, of the Department of Zoology, identified the animal bones; Dr. Robert K. Wyant, Curator, Economic Geology, identified the materials of which the stone tools are made; and Mr. Philip Young drew up the chart showing occurrences of textiles.

To all of these people and to many others who lent us friendly aid, we are grateful.

PAUL S. MARTIN

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I. Introduction

By PAUL S. MARTIN *and* JOHN B. RINALDO

Higgins Flat Pueblo is located in the SW. ¼, Sec. 24, Twp. 6 S., R. 19 W., N.M.P.M., Catron County, Apache Forest, New Mexico (fig. 1). It is situated about three miles northwest of Reserve in an airline. The elevation is about 6,500 feet above sea level. This site was found by Dr. John Rinaldo in 1947 during the course of a reconnaissance. It is situated on a small mesa overlooking the San Francisco Valley and about 100 feet above it. The ruins, consisting of several mounds, depressions, "plazas" and trash heaps, lie on two pieces of private property, the east half belonging to Mr. Roy Hudson and the west half to Mr. Owen McCarty, both of Reserve, New Mexico. Permission to excavate was gladly granted to us by both owners, although excavations during 1953 were confined to the portions lying on Mr. McCarty's land.

From the pueblo one has an excellent view to the north of the deep canyon or "box" that the San Francisco River has cut through igneous rocks. In the other directions may be seen the tops of other peaks.

The San Francisco River usually flows all year, although in the summer months the flow is reduced to a trickle. Near the site, about 300 yards away, is a spring, and this or the river probably was the source of the domestic water supply of the people who lived in the immediate area.

Agriculture was most likely carried on in the river flats where one could be sure of having good soil and plenty of moisture. Some crops may also have been grown, of course, on the mesas near the pueblo.

Before excavation, the site appeared as a low, rock-covered mound approximately 100 meters long and 75 meters wide and about 3 meters high. When we examined the mound carefully we were able to see the outlines of some walls. On the south and east sides of the mound were two large, flat, rectangular areas that we

dubbed "plazas." These areas were not excavated. On the north side of the mound was a trash area, the greatest depth of which was 70 centimeters.

Our principal objective in 1953 was to excavate the youngest, that is, latest, pueblo in the area—one that had been occupied just shortly before the area was abandoned or that had been occupied up to the time of abandonment. After excavation, we were able to assess the assemblage of materials and thus to reconstruct the life of the people during the thirteenth century. Interpretations and integrations of these into a larger context in an attempt to understand cultural processes and change will be our next step.

Higgins Flat site, as it turned out, was not one of the last towns to be occupied in the area, but it must have been one of the latest.

METHODS OF EXCAVATION

It is the purpose of this section to indicate how the excavation of this particular site was carried out; the reader will then understand how the data described in other sections of this report were secured. We believe that the methods used were essentially similar to those which any experienced archaeologist would use on such a site. We do not claim that they are particularly novel or unusually effective solutions of the problems encountered.

Description of the Site

Higgins Flat Pueblo is composed of a larger and a smaller block of rooms with low walls (plazas) and a rectangular great kiva lying between them. It is situated on a broad, flat, gently sloping ridge or mesa on the southeast bank of the San Francisco River (fig. 2). On the north and west sides of this ridge a steep, stony cliff drops somewhat precipitously to the river flats, where there is a grove of large cottonwood trees. Here, at the edge of the river, three small springs flow into quiet pools beneath the river bank. The other side of the ridge falls away more gently toward a shallow, dry gully. At either end of the ridge there are rocky knolls. On the rocks of the knoll at the upper end of the ridge, pictographs of geometric design have been traced and tool-sharpening grooves may also be seen.

The site is only approximately oriented east and west; however, for convenience, the features will be discussed by using an approximate east and west orientation.

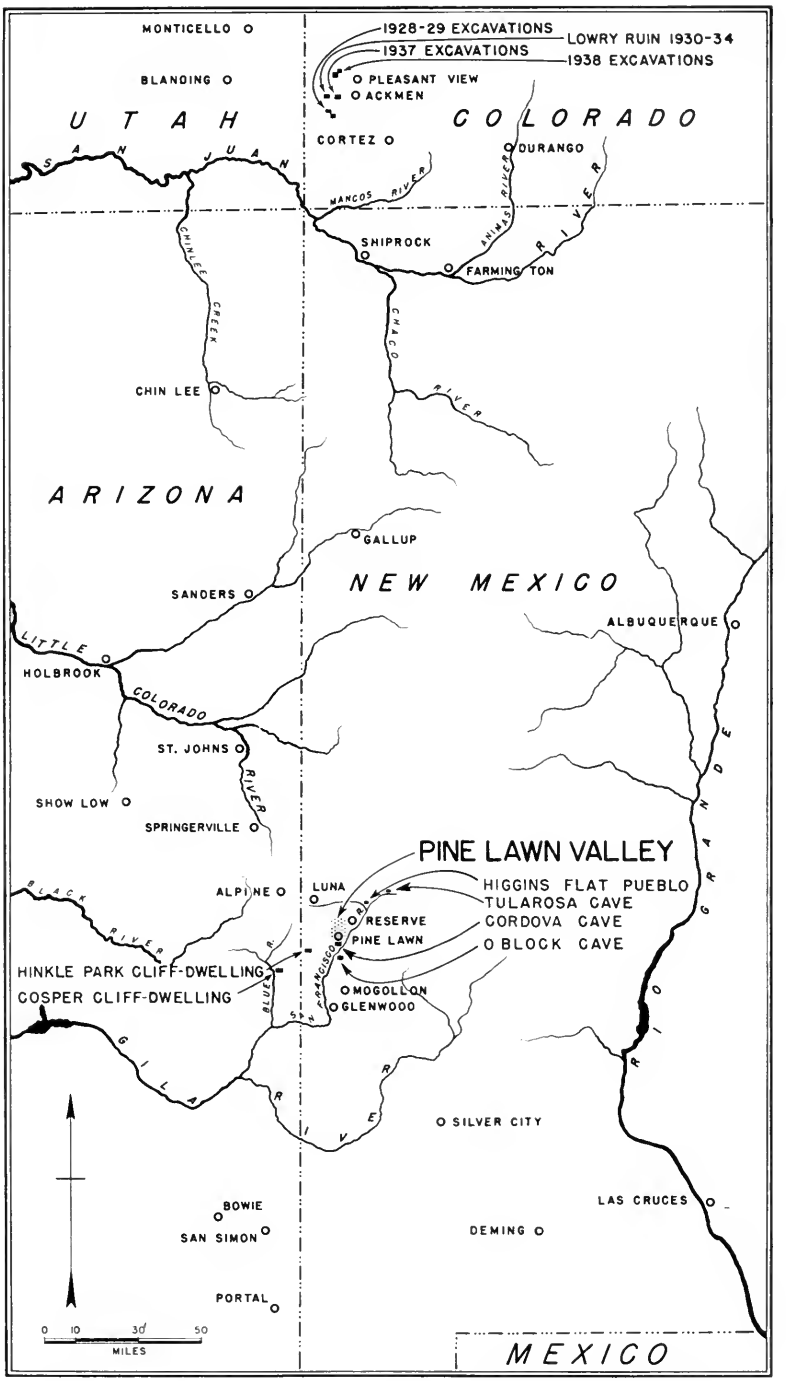


FIG. 1. Map showing location of Higgins Flat Pueblo, New Mexico.

The larger block (fig. 3) of perhaps twenty-five rooms is surrounded on the west, north, and east sides by broad, flat, rectangular areas with low walls that we have called plazas. Previous to excavation this block of rooms appeared as a mound of rock rising about three meters above the plazas. The block once comprised two stories. The smaller block of rooms, comprising only about six rooms one story in height, is a much lower mound set in a small grove of juniper trees toward the lower end of the ridge.

Digging Techniques

During the 1953 season of eleven weeks the Chicago Natural History Museum Archaeological Expedition to the Southwest excavated fourteen rooms and trenched two of the plazas (fig. 4). Three test trenches were also dug through sheet trash beyond the larger house block. All excavations, with the exception of Room N, were carried down to sterile soil. Furthermore, all rooms were completely excavated except Room N, the last room in which excavation was attempted, and the lower floor levels in the southwest section of Room G. These levels were found to have been dug previously by a pot hunter.

The trenches were laid out in a grid of two-meter squares and in the absence of marked soil differences in the profile were excavated in arbitrary 20 cm. (eight inch) levels. This revealed a uniform deposit of dark gray to dark brown surface material containing small amounts of charcoal, animal bone, a few stone, bone and clay artifacts, and many pottery sherds of Reserve and Tularosa phase types (see *Pottery*, p. 137). Below this layer were two sterile layers, the first a dark red to orange stratum of clay or gumbo, and below this a gravelly layer which, it was apparent from the walls of the arroyo to the south, extended only through the upper end of the ridge.

Two pits were the only artificial structures found in this trenching. Both were in Trench I. The first, situated in the center square of the initial trench, was oval in shape, with straight to sloping sides, measuring 115 by 145 cm. at the mouth and with a maximum depth of 50 cm. The second pit, situated two meters south of the first, had a round mouth and was bell-shaped. The mouth was 90 cm. in diameter at the top and contracted to 40 cm. in the middle; the floor of the pit was 70 cm. in diameter. The contraction of the opening occurred about 40 cm. below the old ground level—the sterile reddish-orange layer. This pit had been excavated into the gravel layer for a total depth of about 85 cm.

FIG. 2. Aerial view of Higgins Flat Pueblo and surrounding terrain, looking south.

FIG. 3. Higgins Flat Pueblo, looking west; unexcavated portion on left.

Trench I, located outside the southwest corner of the pueblo, was ten meters (five squares) wide, and was carried toward the pueblo for a distance of eight meters (four squares). Trench II was located near the southeast corner of the pueblo. It was two meters wide and was carried a distance of eight meters toward the pueblo, with an arm extending four meters to the west at the north end. The maximum depth of fill in these trenches was two levels (40 cm.) except in the easternmost squares of Trench I, where pottery sherds and other cultural material were found down into the fourth level, about 70 cm. below the surface. Trench III was located near the southeast corner of the East Plaza. It was two meters wide and six meters long. Trench I not only had the greatest depth of cultural fill, but was also the richest in cultural debris. The richer squares and levels had almost twice as many pottery sherds as those of Trench II. The trends in frequency of the pottery types represented therein follow those of the floor levels in the pueblo rooms and the cave stratigraphy in the area (see *Pottery*, p. 137).

FIG. 4. Higgins Flat Pueblo after six weeks of excavation. Rooms A, B, C, E, and F partly back-filled.

Excavation of the pueblo was begun in one of the centrally located rooms of the larger block, Room A. Then we moved toward the plazas, at first to the north and east, excavating four exterior rooms (B, C, E, F) and one interior room (D); then we excavated rooms toward the south and west, doing exterior Rooms G, I, U and interior Rooms H, K, L, M, and part of Room N. In excavating these rooms the dirt fill of Rooms A, B, C, and D was transported to spoil heaps beyond the plazas by means of large, steel, contractor-type wheelbarrows, and that of subsequently excavated rooms was back-filled into these rooms. The fallen wall-stones were transported in a small truck to a rock pile beyond the dirt spoil heap, and to another pile in the dry gully.

The first step in room excavation was to clear the surface of scattered wall-rocks. This left the general outlines of some of the rooms clear, particularly the exterior walls. However, the thickness of the walls was uncertain and the tops of some interior walls were completely covered. Therefore, the next step was to sink a pit about three feet out from a known wall and carry it down either to

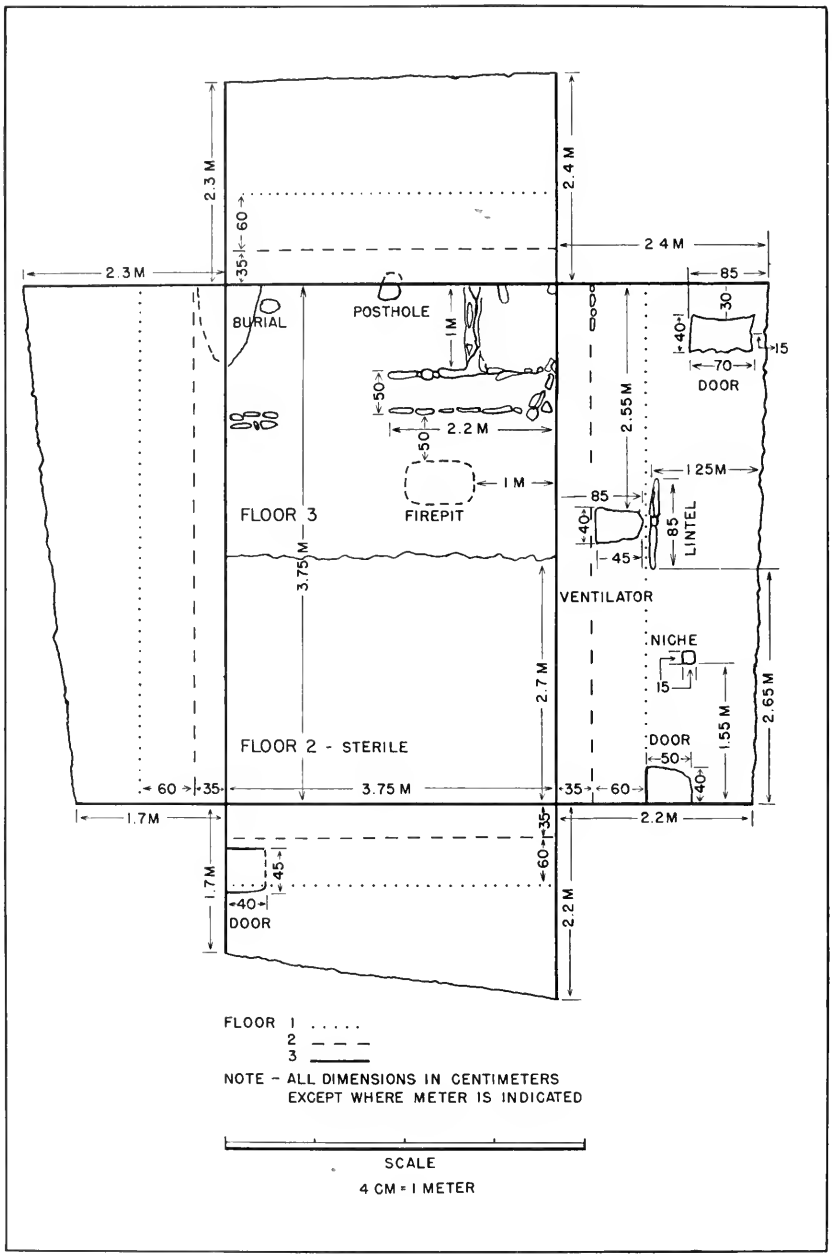


FIG. 5. Sample of plans and four elevation drawings (Room A illustrated), showing method of mapping rooms.

the hard, compact layer of the first floor or deep enough to get below the level of most of the fallen wall-rock. This pit was then expanded into a trench to the wall, at which point it was continued around the walls of the room, following wall plaster or masonry. The remaining central core of the fill was then excavated down to within 15 cm. of the floor. The walls, floors, and floor features were cleared with light tools such as ice picks, geology pick hammers, pointing trowels, and whisk brooms. The rocky upper fill was excavated with large picks and shovels. The larger artifacts, such as manos, metates, and axes, were left *in situ* on the floors. After one floor with its associated features, such as firepits, postholes, mealing bins and manos, had been excavated, it was mapped and photographs were made of the entire room and important features. Notes were taken on these features. Lower floors were excavated in a similar manner, and the lowest floor was mapped in plan and four elevations (see fig. 5) to show location, size, and shape of the floor and wall features, the height of standing walls, and the distribution of the features within the floor and wall space.

When a room had been completely excavated and its features recorded, the plaster was then removed from large areas of the walls to uncover the masonry, which was then photographed and recorded. Wall junctures were probed from top to bottom with a trowel, an ice pick and a geology pick and finally the upper three or four courses of masonry in critical corners were dissected and examined to determine whether they were bonded or abutted. Sub-floor pits into sterile soil, revealed by color contrast, were also excavated, and in this way several sub-floor burials were found.

As the excavation progressed a map was made and vertical measurements for building profiles were taken; a plane table, an alidade and a stadia rod were used. Measurements were then taped and checked.

Most of the infant burials were well preserved. The bones of the adults were badly decomposed, possibly because they were located in corners where they were subjected to more moisture. All of the burials were uncovered and prepared for photography with small tools, such as grapefruit knives, ice picks, paint brushes and whisk brooms.

II. Description of Pueblo Details

By PAUL S. MARTIN *and* JOHN B. RINALDO

WALLS

Foundations

No foundations or sub-structures as such were found except in Room K, where a row of manos set on edge forms a kind of footing. Walls spring directly from floor level and rest on whatever material was there; that is, on trash or on hard, gravelly, sterile soil.

Types of Masonry

1. *Outer walls* (fig. 6) of pueblo indicate some specialization in masonry technique. They may be described as a composite product of laminated slabs and shaped blocks of tuff laid in fairly even courses (for the exterior face) combined with random rubble laid in thick layers of mud mortar (for the interior exposure). Flakes or spalls were inserted in thick mortar to level each course in preparation for the next row of stones. These walls are essentially a stone masonry job and would resist rain more than the partition walls. Through stones occur frequently.

Builders were apparently satisfied with the above described weather-resisting masonry for the *outside* faces of the exterior walls only. Instead of employing the same construction for the second or inner courses or faces of exterior walls, the builders thickened a wall by building, against its inner side, a mass of random rubble packed in mud.

Thus, these exterior walls make up a composite type without core. The exterior face is neat and pleasing; the inner face is less attractive.

2. *Inner walls* (figs. 7, 8) are usually made up of random rubble of cobbles and flakes packed closely into mud mortar. This technique is as unspecialized as seems possible where moderate-sized cobbles or river boulders of dense igneous rock and copious amounts

FIG. 6. Outer wall of Rooms E and F. Meter stick in foreground.

FIG. 7. Random rubble wall of cobbles, Room B. Scale at left in 10 cm. units.

FIG. 8. Random rubble wall of cobbles, Room D. Scale at right in 10 cm. units.

FIG. 9. Partition wall of composite type masonry, Room G. Meter stick at right.

FIG. 10. Partition wall of composite type masonry, Room B. Scale at right in 10 cm. units.

of mud form a wall. Its principal individuality lies in the careful and dense packing of these elements. Little attempt has been made at coursing. Such a mud-rubble wall is narrow, not substantial, and would only serve satisfactorily as a partition wall, since it would not be weather-resistant.

3. The partition walls (figs. 9, 10) in a few rooms (for example, the east wall of Room A and the south wall of Room H) were composite walls (like the exterior walls described under no. 1) and perhaps they were exterior walls at one time.

4. The west wall of Room L was composed of adobe on the side facing into the room and stood 75 cm. in height. Although the room to the west, adjoining Room L, was not excavated, enough exploratory work was done to indicate that the other face of this wall was composed of rubble and mud.

Dimensions

Range of width of exterior or composite walls, 50–60 cm.

Range of width of interior or partition walls, 25–35 cm.

Height of standing walls: greatest, 2.4 meters; least, 80 cm.

Materials

Materials used in walls consisted of shaped blocks and slabs of tuff and unworked river boulders or cobbles of igneous rocks (basalt, diorite, trachyte). *Joints* were not intentionally broken, although broken joints appear, due to the irregular stones used. True-bearing *spalls* occurred rarely and probably by accident. False *spalls* (flat or angular pebbles, thin flat stones, and a few sherds) were inserted in mud mortar to fill voids. *Mortar* consisted of soft, fine, buff-colored clay, sometimes containing a mixture of gravel. *Plaster* usually consisted of what may be called two coats: a thick, rough under-coat, composed of unselected mud and used to smooth over uneven masonry; and the finishing coat, which averaged about 3 mm. in thickness, was made of fine-grained, carefully selected adobe, and was natural in color, unless it had been blackened or reddened by house conflagration. The plaster in Room E was decorated with a white horizontal stripe. In Rooms I and J only undercoating appeared.

Doorways

All fifteen doorways (fig. 11) in the pueblo were rectangular. Many of them had been sealed. There were no exterior doorways except possibly one in the east wall of Room D, and this may have been an exit before Room C was added. The absence of lateral doorways leading to the outside is normal for the houses of Reserve and Tularosa phases (in the Pine Lawn area). One doorway occurred in Three Pines Pueblo (Martin and Rinaldo, 1950b, p. 432). Doorways were provided with both stone slab and wooden *lintels*, the latter consisting of small rods (about 1 cm. in diameter). Sills were either stone slabs or masonry plastered over with adobe. *Jambs* were of adobe plaster; no recessed type.

Height of doorways ranged from 40 to 90 cm., the average being 55 cm. Widths ranged from 35 to 60 cm., the average being 43.

Doorsills ranged from floor level to 55 cm. above floor level.

Placement of doorways appeared to be without plan, for they occurred either at the end or in the middle of a wall and in the side or end walls.

No T-shaped doorways were discovered.

FIG. 11. Rectangular doorway in east wall of Room E; note ventilator opening of earlier occupancy below doorway. Meter stick at left.

FIG. 12. Ventilator opening in east wall, Room A. Scale at right in 10 cm. units.

FIG. 13. Room D, looking down at Floor 2, and duct, firepit and bin in Floor 1. At bottom note ventilator opening into Room A. Meter stick in background; 50 cm. arrow points north.

Doorways in Rooms B, C, D, and M were plugged with masonry seals, and in Rooms C, D, H, and M, with plaster and rubble.

Ventilators and Niches

In the east wall of Room A, very close to floor level, is a ventilator opening (figs. 12, 26) provided with a stout pine lintel. This opening was connected with the fresh air intake by means of a long (2.4 meter) masonry-lined duct (30 cm. wide by 45 cm. deep), the roof of which was composed of transverse sticks and earth. The duct ran under Floor 1 (latest) of Room D (fig. 13) and terminated outside the east wall of D in the area later occupied by Room C. The fresh-air intake was at ground level (fig. 14) and resembled a slab-lined and floored cist, 30 cm. deep and 70 by 80 cm. in breadth. It is assumed that the flow of fresh air down this manhole, along the duct and through the wall opening in Room A, practically at floor level and south of the firepit, was by means of gravity and was induced by the building of a fire in Room A. The hot air probably escaped

FIG. 14. Fresh air intake leading into ventilator duct; below floor of Room C. Arrow points north.

through an opening in the ceiling, thus drawing cool fresh air through the ventilating apparatus. Interestingly enough, this same duct also provided fresh air for Room D by means of a floor opening or register (see under *Floors*). The ventilator opening in Room A and the firepit and other floor features in Floor 2 were covered by 60 cm. of fill and a plastered floor (last floor, Floor 1).

Under Floor 3 (the earliest) of Room A were several features the meaning of which is not clear: a bit of wall, a posthole under the north wall, and two rows of stone slabs set 50 cm. apart. This last feature may have been part of an early ventilating duct, or a series of bins, or a portion of an atypical wall; its actual significance is not known. It would not seem too rash to suppose that a room or two were in existence before the present "nucleus" was erected and that these earlier buildings were partially demolished to make way for later rooms.

In the east wall of Room E was another ventilator opening with sub-floor duct and exterior fresh-air intake exactly like those found

FIG. 15. Room B, showing features of Floor 2. In center, fresh air intake for duct leading into Room E. Meter stick in background.

in Room A and under Room D. The manhole intake measured 40 cm. by 60 cm. in breadth and 60 cm. in depth; the walls were made up of cobble stones. This fresh-air intake had been covered over by the latest plastered floor (no. 1) in Room B (fig. 15). It seems clear from this fact and the other evidence given below, that Room B did not exist while the ventilator in Room E functioned. The alterations in Room E that included installation of Floor 2 and the reconstruction in Room B brought to an end the functioning of this apparatus.

A niche was found in the south wall of Room B, 10 cm. above Floor 2, the height of the opening being 60 cm. and the width 50 cm.

FLOORS

(Figures 16–21)

Note: Floor 1 indicates latest occupation; Floor 2 an earlier one; Floor 3 the earliest.

Materials

The floors were composed of gravelly orange-yellow clay, or buff clay, or fill, over which was laid a smoothed adobe finish.

Alterations

Very few, if indeed any, original floors were found (figs. 19–21). Throughout the life of the town, changes were being made and the floors were not excepted. Sometimes only a new adobe surface was added; more frequently a quantity of fill was lugged in, varying from a few centimeters in depth to 60 cm., spread evenly over the present floor and then nicely covered by a smooth finish-coat of adobe. We found one floor in Rooms C and J; two floors in Rooms B, F, G, and L; and three floors in Rooms A, D, E, H, I, K, and M.

Flour Receptacles, Mealing Bins, and Pits

Fifteen of these were found. In the latest floor of Room A were two adjacent mealing bins, 35 × 30 cm., depth 25 cm., separated by an adobe coping 8 cm. wide (fig. 22). The sides and bottoms were of slabs, the bottom ones showing grinding marks. A mano rested *in situ* in each of these bins. In Floor 2 were traces of two other bins.

In the latest floor of Room B were four adjacent mealing bins, with slab sides and bottoms, each bin separated from the proximate one by adobe coping 8 cm. wide (fig. 23). Each was 30 cm. square and 15–20 cm. deep.

Five receptacles were found in Floor 1 (latest) in Room C. The first, third and fifth were fitted with pottery bowls (Tularosa Fillet Rim); the second and fourth were slab-lined and bottomed. Breadth of openings about 35 cm., depth 25 cm. Each receptacle was separated by an adobe coping 8 cm. wide. Slab-bottomed bins were perhaps actually used for grinding, pottery-lined receptacles as containers or flour receptacles.

Three pits, use of which is not certain, were located in the last floor of Room J. These measure about 50 cm. in diameter and 30 cm. in depth.

Against the east wall of Room D, Floor 1, was a stone-lined pit, 20 × 25 cm. and 10 cm. deep.

Below the latest floors of Rooms A, D, and E were found traces of partly demolished grinding bins.

FIG. 16. Room B, Floor 1. Center, corn mound; upper left, through trough metate. Meter stick in background; 50 cm. arrow points north.

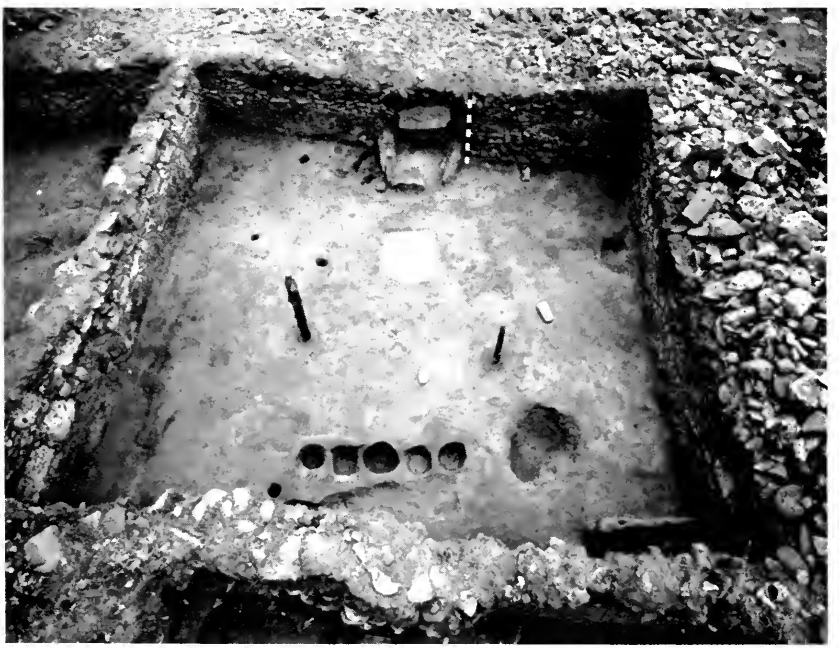


FIG. 17. Room C, Floor 1. Foreground, five flour receptacles; upper portion, firepit and altar(?). Meter stick in background; 50 cm. arrow points north.

FIG. 18. Room H, Floor 2. Center, Reserve Indented Corrugated jar; right, circular worked slab. Meter stick in background; 50 cm. arrow points north.

Firepits

Twelve firepits were discovered (figs. 24, 25). All were rectangular except two; these were round and were located in earlier floors. Four were slab-lined. None had adobe curbing. The firepits were located near the center of the rooms. The rectangular firepits ranged in width and length from 55 × 60 cm. to 1 × 1.25 meters; depths ranged from 10 to 30 cm. The round firepits measured 50 cm. in diameter and 20 cm. in depth. All firepits contained ash in quantity.

Ventilator

In the floor of Room D was a register that supplied fresh air from a sub-floor duct (fig. 26) (see p. 36).

CEILINGS

Height

Actual height is not known. The highest standing wall (Room A) was 2.05 meters. No beam holes, sockets, or supports of any

FIG. 19. Room A. Meter stick in background; 50 cm. arrow points north; both rest on Floor 2. Slab-lined firepit and mealing bins on unexcavated pillars belong to Floor 1; rectangular firepit in center background belongs to Floor 2.

kind were located. We conclude that the ceilings of some of the rooms at least and certainly the one that accompanied Floor 2 of Room A were more than 2 meters high.

In the last occupation of Room A, at which time the level of Floor 1 was raised by 60 cm., the height of the ceiling would have been about 1.40 meters. There is a possibility, however, that a second story was added and that it may have covered Rooms D, K, and E also. In this event, the height of the ceiling for the last occupation level (Floor 1) of Room A might have been raised when the walls were built upward.

Type

Unknown except by inference. In a few rooms, one large beam was found that spanned the length of the room. We assume that smaller secondary beams rested on the main beam and that the ends rested on a ledge or in a socket, and on top of the secondary beams, splints, and adobe. This reconstruction is based partly on excavated

FIG. 20. Room E, Floor 1. In right center, worked slab resting on firepit; in upper center, fragments of through trough metate. Meter stick in background; 50 cm. arrow points north.

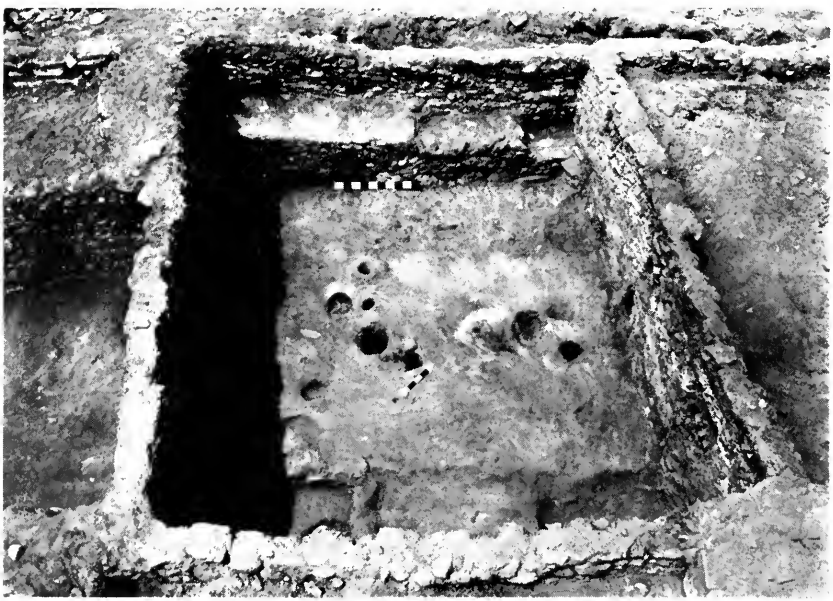


FIG. 21. Room E, Floor 3. Masonry against which meter stick is resting represents former exterior wall; top of ledge over meter stick represents level of Floor 1; 50 cm. arrow points north.

FIG. 22. Mealing bins and manos, Floor 1, Room A; 30 cm. arrow points north.

evidence in Higgins Flat Pueblo and partly on the type of ceilings (roofs) we found in Hinkle Park Cliff-House. The size of the beams is unknown. They were probably yellow pine.

Secondary or Vertical Roof Supports

Holes for extra vertical roof supports consisting of wooden (cedar?) posts were found in several rooms—A, B, C, E, G, H, and L. Diameters ranged from 20 to 65 cm.; depths from 20 to 65 cm. There were a few other very small holes in the floor and these also may have held vertical roof supports.

GENERAL ARRANGEMENT OF PARTS

We estimate that the pueblo contained about thirty rooms, thirteen of which were excavated (fig. 27). Near-by are several flat areas bounded by low walls (plazas?), all unexcavated, and a kiva with a ramp entrance. Whether these structures, plus a few other rooms and depressions and Higgins Flat Pueblo, were all

FIG. 23. Mealing bins, Floor 1, Room B; 30 cm. arrow points north.

functioning simultaneously or not, we do not know. The kiva with ramp was excavated in 1954 (MS. in press).

The size of rooms ranged from 2 × 1.30 meters (K) to 7.40 × 5.80 meters (B). Five rooms (F, J, K, L, M) might be classed as small (about 5 square meters); three (D, G, H) as medium large (between 11 and 18 square meters); four (A, C, E, I) as large (between 20 and 25 square meters); and one (B) as very large (about 43 square meters).

Use of Rooms

Rooms A and E probably were larger at one time (see section dealing with the mechanics of the growth of the pueblo, pp. 48–54) and may then have been kivas. This interpretation is based purely on an architectural aspect—the ventilator apparatus—rather than on functional data that are entirely lacking.

Room B in its final stage may have served as a kiva or ceremonial room. This statement is based solely on the fact that a cone of stone was found on the floor. This cone is sometimes referred to as a "germ god," a "corn mountain," or a "corn mound." Cones like the one in Room B (fig. 16) and made of clay, wood, or stone,

FIG. 24. General view of Floor 1, Room A. In center, rectangular firepit near which lay manos and broken jars; in left center, posthole. Meter stick in background; 50 cm. arrow points north.

FIG. 25. Room I, Floor 2. Rectangular firepit on unexcavated pillar belongs to Floor 1; top left, through trough metate and a mano; long narrow space at left is Room J. Meter stick in background; 50 cm. arrow points north.

have been reported from several sites in the Southwest (see Watson Smith, 1952, pp. 233–234, for an excellent discussion). Similar objects are associated with altars in modern Pueblo kivas.

Rooms J, K, L, and M, inhabited during the last occupation of the site, were small and may have served as store rooms.

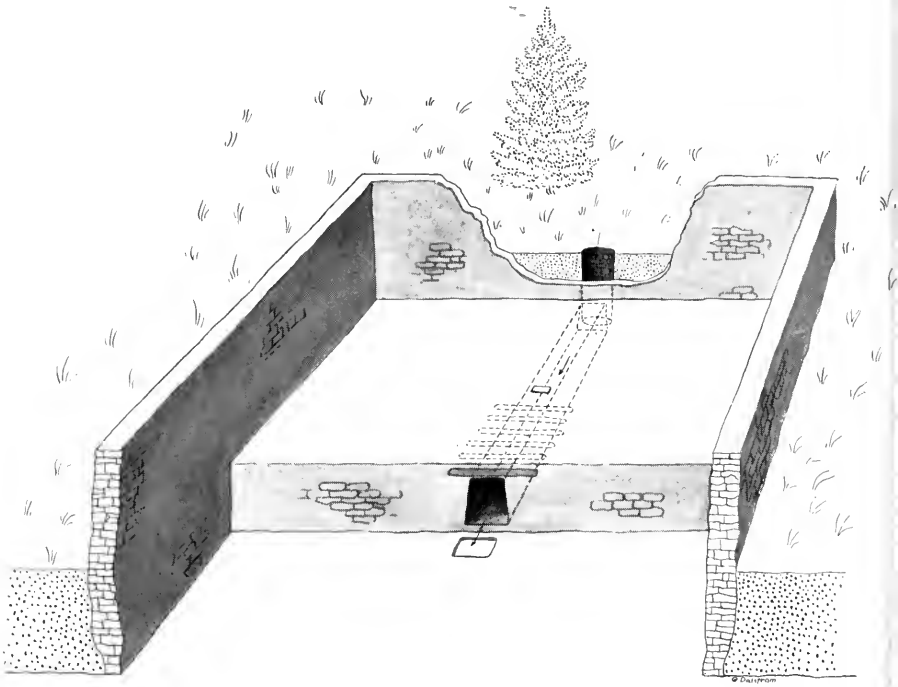


FIG. 26. Perspective drawing showing east half of Room A, raised area later partitioned to form Rooms D and K, firepit, ventilator duct, fresh air register, and fresh air intake.

The other rooms (A, C–I) probably served as living quarters in the last stage of occupation.

Number of Stories

Evidence on this point is unsatisfactory except for Rooms A, D, and K. It would appear that there was a second story over these rooms. This guess is based on the following points: (1) evidence of a collapsed second "floor" (adobe chunks, remains of firepit, pottery *in situ*) about 50 cm. below top of fill in Room A; (2) two doorways in the east wall of A, the sills of which were unusually high (55 cm.

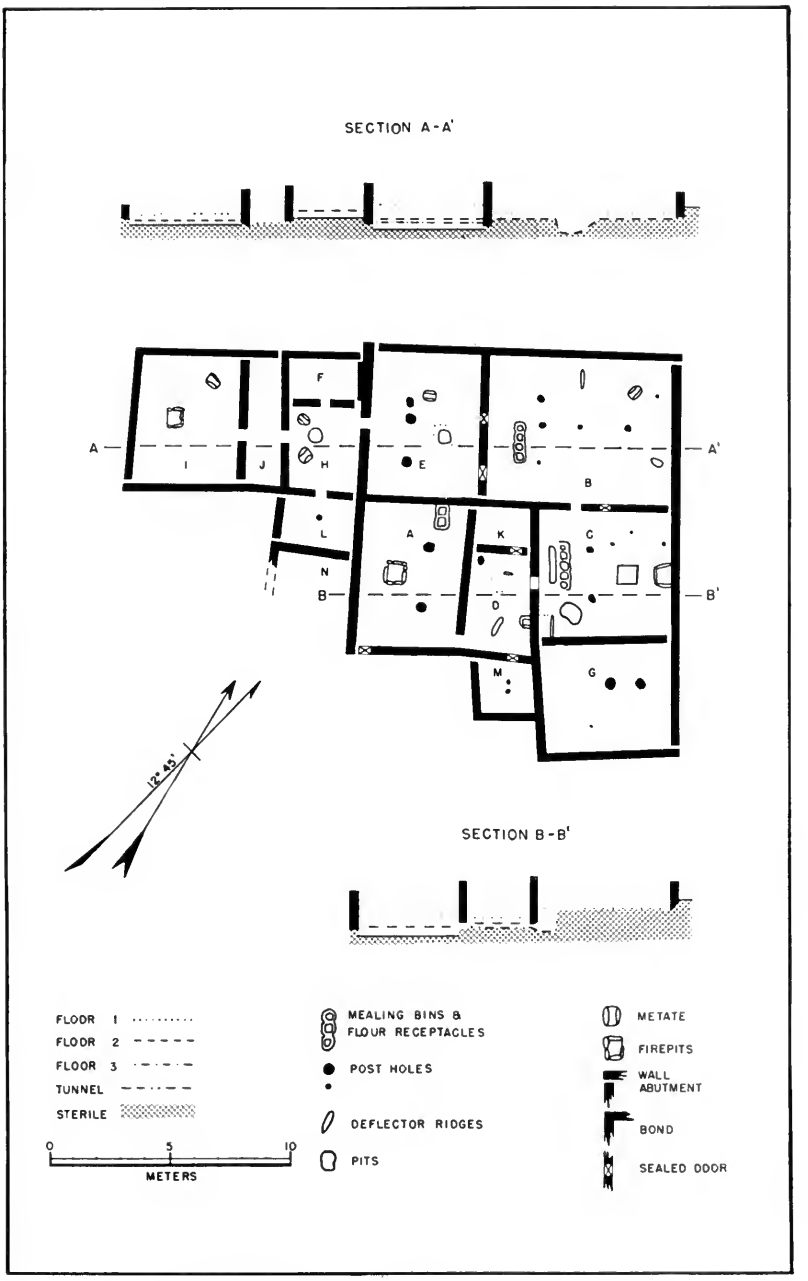


FIG. 27. Ground plan and sections of excavated portion of Higgins Flat Pueblo.

above the latest floor, 1); and (3) the enormous amount of building stone in the fill.

Probably the remainder of the pueblo was one story high.

THE BUILDING SEQUENCE AND ITS MECHANICS

A study of the wall junctures, foundations, masonry types, doors, floor levels, and other architectural features shows that all the pueblo was not built at one time. There were at least four periods of construction and alteration, and probably more. On the other hand, the unity and regularity of the rooms in each section suggest that the construction during each period was done in a planned and orderly fashion.

The various periods of construction in what is estimated to be their approximate sequence are as follows:

Former Rooms

The evidence for this period consists of the fragmentary walls and their adjacent floors in Rooms E and A. The lowest floor sections and fragmentary walls in these two rooms probably comprise a unit, because the fragment of east and west wall in the northwest corner of Room A and the south side of the slab-walled structure on Floor 3 of the same room are in line and equidistant (1.5 meters) from the north wall of Room A. Also, the post under the north wall of Room A, and the west end of the slab-walled structure, both of which are 1.6 meters from the west wall, are practically in line with the fragment of north-south wall in Room E, which is 1.7 meters from the west wall of that room.

This unit of one or more rooms—call it "Room X" for convenience—is probably the oldest unit in the pueblo because (1) the floors were excavated into the sterile soil 35 cm. or more below the level of the lowest adjacent floors; (2) the fragmentary walls are lower than the lowest courses of the adjacent walls of Room A or E; (3) both wall fragments and depressed floors were covered by two or more floor levels of later occupation, characterized by later pottery types in differing frequencies; (4) the later walls in this area are based on greater depths of fill (30–40 cm. to the first course) than the average wall foundation in other parts of the pueblo; (5) the fragmentary walls are of early mud rubble type.

Nuclear Unit

Rooms E, A, D, K, and B-1 (fig. 28, top) were probably built as a unit. Rooms E, B-1, A, and K were built at the same time because they share a continuous wall. This wall forms the south side of Rooms E and B-1 and the north side of Rooms A and K. Furthermore, the west wall of Room E, the west wall of Room A, the fragmentary east wall of Room B-1, and the east wall of Rooms K and D were all bonded into this wall. In turn, the north wall of Rooms E and B-1 and probably the south wall of Rooms D and A were bonded into the east wall of Room B-1 and the east wall of Room D so that two large rooms were formed which were partitioned off into the several rooms of the unit.

That Rooms E, A, D, K, and B-1 were coeval is also indicated by the similarity in size, shape, arrangement of room features, and relationships between the rooms; for example, the relationship of the larger Room E to the smaller Room B-1 is parallel to that of the larger Room A to the smaller Room D in that they share ventilator ducts of similar construction opening out in the same direction into what might be termed manholes, or vertical shafts.

This unit was probably the nuclear unit because (1) it is the only unit with four sides formed by walls bonded together; (2) the lowest floors in the pueblo are in this area, although it is on the uphill part of the natural slope (four room floors range from 240 to 249 cm. in sterile soil below the datum); (3) this was the area in which the "former rooms" were built, and since the area was cleared it would have been easier to continue construction in this cleared area; (4) the pottery types and their frequencies are earlier than those of the lowest floors in the other rooms excavated.

Because of the lack of excavation south and west of Room M its relationship to the other rooms of this unit is not clear. However, it shares two walls (its north and east walls) which are bonded into the walls of the unit, its lowest floor is at the same level, and the level of the door opening into Room D is sealed at Floor 1 levels of both Room D and Room M. These facts indicate that this room was first occupied at the same period as Room D.

First Addition

The first addition (fig. 28, center) was comprised of Rooms I, J, H, F, and L. That these rooms were one unit is shown by the following: (1) the doorways from Room I to Room H through Room J

are in line; (2) Rooms I, J, and H have a common south wall without any breaks in it; (3) Rooms J, H, and F share a common wall bonded into the north (outside) wall of Room F; (4) Rooms I and J share a common continuous north wall and are actually one room divided by a north-south partition butted at either end. Their common north wall is bonded into the west wall of Room I.

The floors of these rooms were excavated into the sterile soil at a depth ranging from 215 to 223 cm., whereas those of the nuclear rooms M, E, and K were filled up to this rough level from their original lower level and were floored over. The bottom floor (Floor 2) of Room D is at this level.

Second Addition

If it may be assumed that the manhole openings of the fresh air ducts beneath Rooms D and B-1 (fig. 28, bottom) opened outside the pueblo, as they do in most known southwestern prehistoric ventilating systems, then Rooms C and B did not exist when the manholes were in use. Although this seems a fair assumption, it raises a problem with reference to the north wall of Room B. The south wall of Room B changes in masonry character and inclines a little towards the interior of the room west of the bond where the east wall of Room B-1 joined this wall. However, the north wall is continuous and of the same character on both exterior and interior surfaces from the northwest corner of Room E to the northeast corner of Room B; so, although there is evidence of an addition to the south wall, the north wall does not indicate such a reconstruction, and we are forced to conclude that the wall stood alone, or that the masonry was perfectly matched in an addition, or that this wall did not exist until later. There is some evidence pointing toward the last assumption: the lower north wall of Room E is almost a meter thick and appears to be, on the interior, a remnant of an earlier wall. If this earlier wall had been extended a few feet beyond the east wall of Room E it would have formed the north wall of Room B-1.

Rooms B, C, and G and the north wall of Rooms B and E were probably added after Rooms I, J, F, and H. Before the new north wall of Rooms E and B-1 was built, however, there occurred an alteration of the old north wall. It was either partly torn down, perhaps because it was in danger of falling, or actually fell down, leaving a section about 80 cm. high (it is higher at the end near Room F). To strengthen the new wall an effort seems to have been

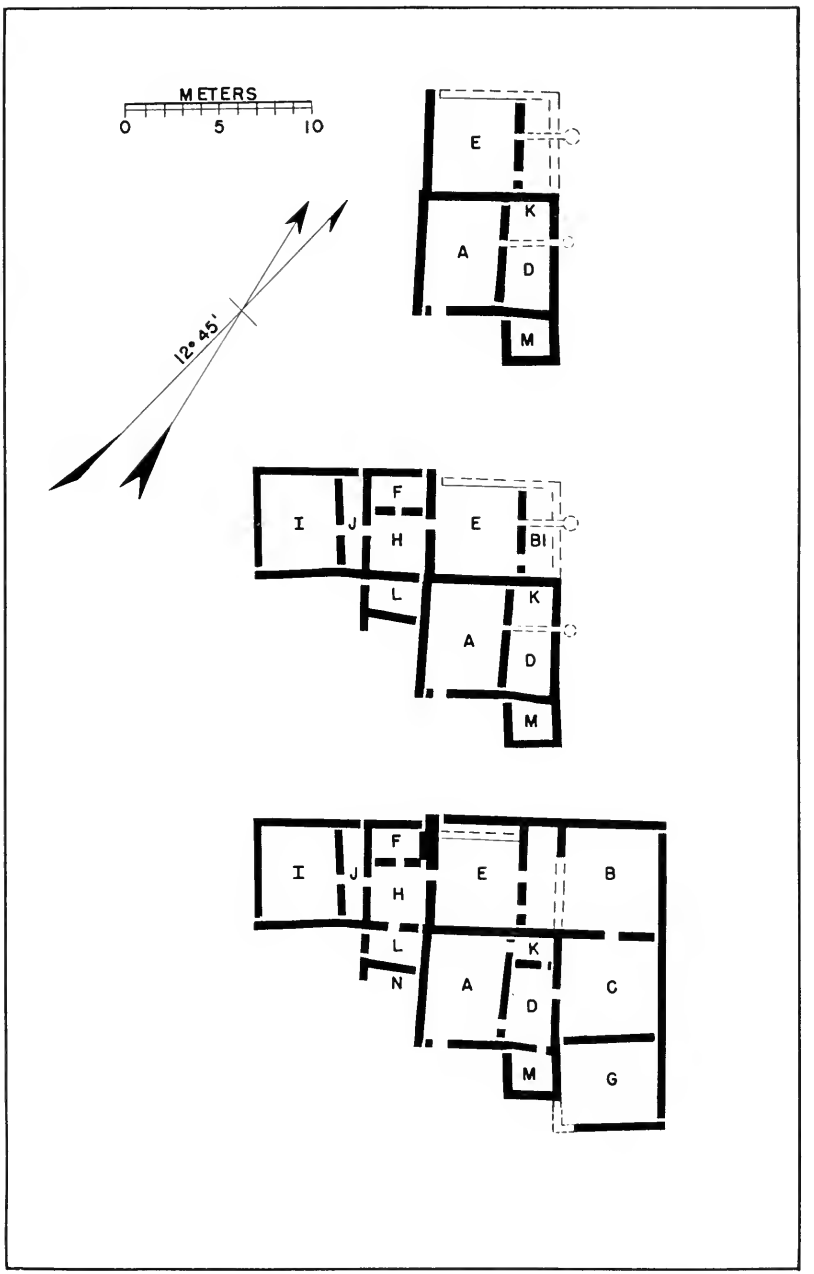


FIG. 28. Plan showing Higgins Flat Pueblo growth, nuclear unit at top; center, first addition; bottom, second addition.

made to key it into the old wall. The new wall was built up directly beside the old and cemented to it with mortar, and when the new wall reached the height of the top of the old, it was widened a few centimeters so that the old wall stands partially in a recess underneath the new wall.

The new wall abuts on the end of the north wall of Room F, and its greater width forms a jog one course wide. From this corner to the East Plaza corner where the east wall of Rooms B, C, and G abut on it, it forms a continuous and homogeneous wall. The east wall of Room B-1 was bonded into it, perhaps by extending the east wall to the north.

The east wall of Room B was probably built at the same time as the new north wall, inasmuch as both are of very similar construction and much more like each other than like any of the other composite masonry walls such as the south wall of Room B, the east wall of Room A, the south wall of Room H, or the north wall of Rooms I, J, and F.

Besides this common continuous outside wall which Rooms B, C, and G share, they are tied together by a similarity in size, shape, and floor plan (placement of firepits, roof support posts, etc.), although at a later period when Room B was opened up into Room B-1 it was much larger.

These rooms are later than Rooms A and D or Rooms E and B-1, because the manholes of the fresh air duct complex were floored over and covered with other features such as bins when Rooms B and C were occupied. However, there was an interval after Room B proper was built before the Room B-1 east wall was torn down, as is indicated by the fact that a doorway (later sealed) leading from Room B to Room C is centered between the east wall of Room B and the broken out bond marking the east wall of Room B-1, whereas after the room was enlarged another doorway appears to have been put through and centered between the east wall of Room B and the partition wall between Rooms E and B.

The floor levels of this (second addition) period range between 182 and 203 cm.

The east wall of Room F was probably strengthened at this time by building beside it a third course of shaped blocks and laminated slabs. Its proximity to the double (or triple?) north wall of Room E leads one to believe that its construction is tied up with an attempt to strengthen the older wall. The difference is that there is a plastered surface between the old and new walls of Room F because

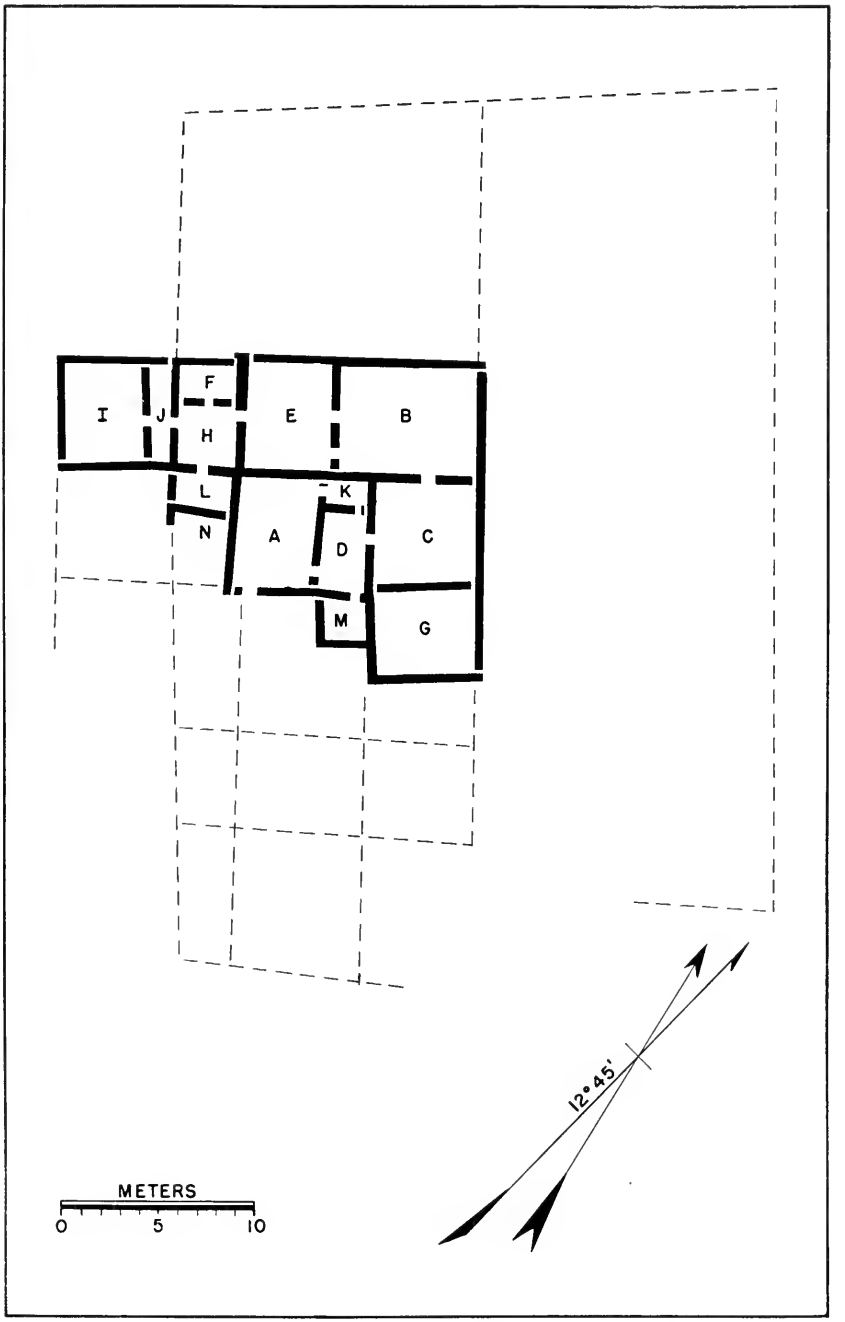


FIG. 29. Plan of excavated portion of Higgins Flat Pueblo showing alterations of fourth period; dotted lines outline unexcavated rooms and plazas.

the new wall was added to an interior surface, whereas in Room E the new wall was added to an exterior surface, which was not plastered.

Fourth Period Alteration

The east wall of Room B-1 (fig. 29) was torn down and the entire larger room re-floored. The older door between Rooms B and C was sealed up with masonry and a new one was centered between the east wall and the then new west wall of Room B.

During this last period or before the pueblo was abandoned several others were sealed up: the door between Rooms D and M, and the doors between Rooms B and E, etc.

Additional floors were laid over the older floors in some of these rooms, as is indicated both by plaster and by floor features such as firepits and mealing bins. The next general floor level appears to have been between 141 and 156 cm.

This is the final period of construction that is indicated by architectural features in these rooms of the pueblo. It may also mark the final occupation of this site, inasmuch as surface indications and trenching through trash areas in other sections of the site revealed nothing later in the way of pottery types, artifact types, or architectural features.

III. The Artifacts of Higgins Flat Pueblo

By JOHN B. RINALDO

Among the main interests in the study of the artifacts from Higgins Flat Pueblo was the attempt to infer from their used surfaces and their position in the rooms the way in which they were used to fulfill the needs of the people of the pueblo. Another interest was comparison of the artifacts from each level with similar objects from the other occupation levels within the site and with those of other sites and horizons in the local area and in other areas.

HANDSTONES

Discussion

The term "handstone" is used here to refer to manos, rubbing stones, polishing stones, and pestles. Generally speaking, these objects are oblong and have one or more broad working surfaces worn by considerable use. Manos and rubbing stones are in some instances so similar in form that the only distinction made between them is one of size. As the name denotes, the handstones were all used in the hand, probably for milling or grinding foodstuffs and paint in conjunction with another grinding stone (metate, paint grinding stone, mortar, etc.). Some manos were held in both hands and are up to 25 cm. in length or more. Others were held in one hand and range in length from 15 cm. to about 10 cm., at which point they were arbitrarily classed as rubbing stones. Likewise, a dividing line between rubbing stones and polishing stones was arbitrarily set at about 7 cm., although these criteria were not rigidly adhered to if other characters were clearly diagnostic.

There are, moreover, a number of differences between these major classes, and the majority of specimens can be classified by the shape, the degree of finish, and the condition of their working surfaces; for example, of the 307 manos, or fragments thereof, recovered 238 were rectangular in outline. The majority of them have been carefully shaped on their broad surfaces and edges so that

they are symmetrical, and their grinding surfaces are generally coarse-grained and frequently roughened by pecking with a hammerstone. They also tend to be about twice as long as wide.

The majority of rubbing stones are of oval shape or are irregular in outline. Most of them have not been shaped, except as the result of use, their working surfaces, although occasionally pecked, have a tendency to be smoother than those of manos and they are almost as wide as they are long. The polishing stones represent another extreme; all of them are round or ovoid in form and except for their facets most of them are virtually indistinguishable from ordinary polished river pebbles. Their flat-faceted working surfaces are smooth and polished.

On the other hand, even the rectangular manos did not have sharp square corners, or straight ends. Their corners are blunt and their ends curved. In some instances, this form may be partly intentional, as indicated by ends pecked into shape, and in other instances it may be the result of wear on the sides of a metate trough. That the Mogollon Indians used straight back-and-forth motion on their metates is indicated by scratches in the troughs of the metates and scratches and roughening on the rectangular manos at right angles to the long axis.

The 69 oval manos tell a different story. Many of these are natural oval stones and were never shaped except on their working surfaces. Others, in particular the beveled manos and the manos that are wedge-shaped in cross section, have been worn to oval shape by prolonged use. This is clearly shown in the beveled manos by a series in which a more obtuse angle made by the grinding surfaces is invariably correlated with a rectangular outline, a less obtuse angle by corners worn off or by an oval shape.

Most of the beveled manos (fig. 34) are made of a fine-grained stone. The longitudinal ridge on these runs at a slight angle from end to end so that one end of each of the beveled grinding surfaces is wider than the other. The scratches on these manos also run at a slight angle from perpendicular to the long axis, also indicating that they were moved up and down the metate grinding surface with one end somewhat preceding the other.

Only five manos had rocker bottom grinding surfaces (more convex from end to end than from side to side). This type of grinding surface is more common on manos from the Three Circle Phase and the Reserve Phase villages and is probably correlated with the greater number of their metates on which the sides of the trough

curve up gently. On the contrary, the most common type of mano from Higgins Flat Pueblo was rectangular in outline and had a flat grinding surface or surfaces. This type was probably used with metates having flat-bottomed troughs or flat grinding surfaces, which are most prevalent at this site. The grinding surface of manos ranges in texture from coarse to smooth.

Only 17 manos which were wedge-shaped in cross section were recovered, whereas 59 beveled manos, which are triangular in cross section, were recovered. These two types were undoubtedly produced by different types of grinding motions and their occurrence in such number at this late site would indicate that the type of motion which produced beveled manos was becoming more prevalent.

A number of manos were found in direct association with the two mealing bins in the northeast corner of the upper floor (Floor 1) of Room A. Four of these rested on the grinding surface of the slab metates, where they were left when the room burned and the roof fell in. Others formed the walls of the mealing bins and were set in the adobe, while still others were found close by. Those in place on the grinding surfaces were rectangular, with flat or slightly convex grinding surfaces (field nos. 161, 107, 108).

No manos were found in direct association with the trough metates. For the most part the other manos were found scattered about the floors of the rooms in groups containing from three to five specimens; for example, three were found around the central firepit on Floor 1 of Room A. Another group of five specimens was found along the west wall of Room E on Floor 2, and still another small group was recovered from the northwest corner of Room H.

Forty-five mano fragments were recovered from room fill and five from the trenches through the rubbish, whereas 35 were recovered from room floors. This might indicate a tendency to discard broken manos, but it also might indicate that some mano fragments continued in use.

A few whole manos were found to have been set on edge as a veneer over the fill beneath the lowest course of masonry in the northeast corner of Room A just above Floor 3 and in the southeast corner of Room K, Floor 3. One of these was rectangular, with one flat and one beveled grinding surface (no. 323), another was oval, with two flat grinding surfaces (no. 483), and a third was rectangular, with one convex and one flat grinding surface (no. 322).

Only one third of the rubbing stones were found on the floors of the rooms and none of these was in a position that suggested its

use. It seems probable that they were used as one-hand grinders or to smooth the plastered walls and floors of the rooms, as Kidder (1932, p. 72) has suggested. It seems probable that the custom of using one-hand manos and the larger rubbing stones as grinders lingered on from earlier periods. One-hand manos were observed in direct association with metates at the SU Site (Martin and Rinaldo, 1947, p. 315) and at Turkey Foot Ridge Village (ibid., 1950a, p. 307).

Distribution

More beveled manos were recovered from the upper floor levels than from the lower ones. This tendency toward an increase in the number of beveled manos in the later phases of the Pine Lawn Valley sequence corroborates observations that we made on specimens from the later levels of the caves, the cliff dwellings, and the open sites of the Reserve Phase excavated in previous seasons. This increase also agrees with their temporal distribution in northern areas of the Southwest (Kidder, 1932, p. 71; Bartlett, 1933, p. 19), where they came into use about A.D. 1050 and increased in popularity into prehistoric times.

Only eleven manos less than 15 cm. long were recovered. The vast majority of manos are the long "two-hand" type and range up to 26 cm. in length. This also corroborates the trend toward the use of the longer manos in the later periods—a trend observed elsewhere (Martin and others, 1952, p. 109). Probably related to this trend toward the use of longer manos is the relatively small number of rubbing stones found on the later sites in relation to the number of manos found; for example, at the SU Site of the Pine Lawn Phase one rubbing stone was found for every two manos (110 to 225). From the Three Circle Phase pit-houses of the Pine Lawn Valley (Turkey Foot Ridge, Twin Bridges and Late SU Site) the number of manos was roughly the same (219) but the number of rubbing stones (40) had diminished by more than half, so that the ratio at that time stood approximately one rubbing stone to five manos (Martin and Rinaldo, 1950a, Table 9, p. 356). From the Reserve Phase sites (Martin and Rinaldo, 1950b, p. 449) the ratio is about one rubbing stone to four manos. From Higgins Flat Pueblo, however, the ratio is roughly one rubbing stone to nine manos (35 to 307). Again, from Hinkle Park Cliff-Dwelling (Martin and Rinaldo, in press) the ratio was roughly one rubbing stone to twelve manos (4 to 50). It should be noted here that this trend is not borne out by the Tularosa Cave collections.

The relatively small number of polishing stones recovered from Higgins Flat Pueblo may be a concomitant of the trend towards greater popularity of corrugated and textured wares at the expense of the plain wares, although it would seem that the highly polished iridescent Tularosa Fillet Rim and Reserve Smudged pottery bowls would require more polishing than the ordinary Alma Plain or San Francisco Red. All of the polishing stones came from the lower (earlier) floors and fill.

Only one pestle was found in Room E, where most of the mortars occurred. No mortars were found in Room A, where most of the pestles were found. The paucity of pestles in this site is symptomatic of the decreasing trend in these objects noted elsewhere in this area (Martin and Rinaldo, 1950a, p. 315).

Classification of Manos

Manos with single grinding surfaces:

(a) Oval in outline, surfaces parallel, grinding surface convex (fig. 30, top) 6

From Rooms A, B, L, floors; Rooms A, B, fill.
Lengths, 14.9, 15.6, 26.4, 21.7, 18.3, 17.5 cm.
Widths, 8.8, 8.8, 15.1, 10.2, 11.8, 9.2 cm.
Thicknesses, 5.0, 3.6, 8.9, 4.9, 3.4, 4.9 cm.

(b) Oval in outline, surfaces parallel, grinding surface slightly convex... 5

From Rooms A, D, floors; Rooms B, C, fill.
Lengths, 17.9, 21.3, 19.4, 10.6, 16.8 cm.
Widths, 10.2, 11.1, 10.5, 8.8, 10.3 cm.
Thicknesses, 5.9, 6.2, 3.6, 3.8, 6.3 cm.

(c) Oval in outline, surfaces parallel, grinding surface flat 9

From Rooms A, D, floors; Room B, North Plaza, fill.
Length, 14.4–20.0 cm.; average, 17.6 cm.
Width, 8.3–13.0 cm.; average, 10.0 cm.
Thickness, 3.8–7.4 cm.; average, 4.9 cm.

(d) Round in outline; surfaces parallel; grinding surface convex (fig. 30, center) 1

From Room A, Floor 1.
Length, 14.1 cm.; width, 10.4 cm.; thickness, 5.9 cm.

(e) Rectangular in outline, surfaces parallel, grinding surface convex... 8

From Rooms E, L, N, floors; Rooms A, B, D, fill.
Lengths, 19.4, 22.6, 21.9, (frag.), 19.3, 18.5, 19.4 cm.
Widths, 10.4, 10.5, 11.2, 10.5, 9.3, 10.2, 8.9, 11.0 cm.
Thicknesses, 4.6, 5.8, 3.2, 5.9, 2.4, 3.6, 4.2, 5.7 cm.

(f) Rectangular in outline, surfaces parallel, grinding surface slightly convex (fig. 32, *b*) 17

FIG. 30. Oval manos. Length of bottom specimen, 16.8 cm.

From Rooms A, D, G, floors; Rooms A, B, C, D, fill.
Length, 16.8–25.3 cm.; average, 20.5 cm.
Width, 9.6–13.1 cm.; average, 10.9 cm.
Thickness, 2.8–6.0 cm.; average, 3.8 cm.

(g) Rectangular in outline, surfaces parallel, grinding surface flat (fig. 32, *c*) 40

From Rooms A, C, D, M, N, floors; from Rooms A, B, C, D, E, H, fill.
Length, 16.9–29.6 cm.; average, 22.0 cm.
Width, 8.5–14.0 cm.; average, 10.4 cm.
Thickness, 1.7–9.8 cm.; average, 4.3 cm.

(h) Rectangular in outline; grinding surface beveled in a double plane with a longitudinal ridge between (fig. 33, *b*) 16

From Rooms A, C, D, M, N, floors; Rooms A, B, C, J, East Plaza, fill.

Length, 20.1–25.5 cm.; average, 21.9 cm.

Width, 8.3–11.7 cm.; average, 10.3 cm.

Thickness, 2.4–4.9 cm.; average, 3.0 cm.

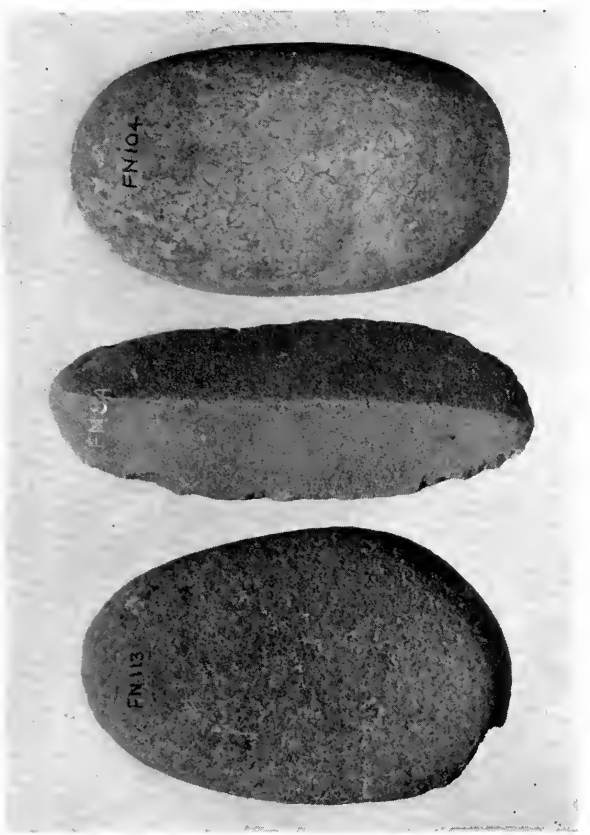


FIG. 31. Oval manos. Length of bottom specimen, 19.5 cm.

Manos with two grinding surfaces:

(a) Oval in outline, surfaces parallel, grinding surface convex (fig. 31, top) 5

From Rooms A, M, floors; Room A, North Plaza, East Plaza, fill.

Lengths, 19.2, 17.6, 19.5 cm., (remainder fragments).

Widths, 11.3, (frag.), 9.2, 11.0, 10.5 cm.

Thicknesses, 4.2, 4.1, 4.0, 3.4, 6.2 cm.

(b) Oval in outline, surfaces parallel, grinding surface slightly convex (fig. 30, bottom) 9

From Rooms A, E, H, M, floors; Rooms A, C, D, East Plaza, fill.
Length, 13.2–21.4 cm.; average, 16.3 cm.
Width, 9.6–12.3 cm.; average, 10.9 cm.
Thickness, 3.5–6.9 cm.; average, 5.4 cm.

(c) Oval in outline, surfaces parallel, grinding surface flat (fig. 31, bottom) 17

From Rooms A, D, E, H, floors; Rooms A, J, North Plaza, fill.
Length, 14.3–21.3 cm.; average, 19.5 cm.
Width, 7.0–13.2 cm.; average, 10.6 cm.
Thickness, 2.4–6.4 cm.; average, 4.2 cm.

(d) Oval in outline, surfaces parallel; one grinding surface convex, the other slightly convex 2

From Room E, Floor 1; Room M, Floor 3.
Lengths, 18.9 cm., (frag.).
Widths, 9.8, 10.2 cm.
Thicknesses, 3.7, 3.9 cm.

(e) Oval in outline, surfaces parallel; one grinding surface flat, the other convex 4

From Rooms B, C, H, Floor 1; East Plaza trench.
Lengths, 23.1, 12.3 cm., (remainder fragments).
Widths, 11.5, 12.1, 9.8, 9.4 cm.
Thicknesses, 4.1, 4.3, 4.9, 6.8 cm.

(f) Oval in outline, surfaces parallel, one grinding surface flat, the other slightly convex 4

From Room D, Floor 2.
Lengths, 21.1, 19.0, 25.3 cm., (frag.).
Widths, 10.9, 9.8, 12.7, 9.7 cm.
Thicknesses, 6.4, 2.9, 5.2, 4.1 cm.

(g) Rectangular in outline, surfaces parallel, grinding surfaces convex .. 7

From Rooms A, B, fill, Trenches I and II.
Lengths, 20.7, 23.6, 19.2 cm., (remainder fragments).
Widths, 7.6, 11.4, 11.1, 10.4, 10.9 cm., (remainder fragments).
Thicknesses, 6.1, 6.0, 2.8, 2.8, 3.4, 6.6, 4.0 cm.

(h) Rectangular in outline, surfaces parallel, grinding surfaces slightly convex (fig. 32, *a*, *d*) 14

From Rooms A, E, H, J, floors; Rooms A, C, D, F, East Plaza, fill.
Length, 17.1–25.4 cm.; average, 21.0 cm.
Width, 8.7–12.1 cm.; average, 10.6 cm.
Thickness, 2.4–6.8 cm.; average, 4.2 cm.

(i) Rectangular in outline, surfaces parallel, grinding surfaces flat (figs. 32, *e*; 33, *d*) 54

From Rooms A, C, D, E, G, H, I, K, L, M, floors; Rooms A, B, C, D, E, J, East Plaza, North Plaza, fill.
Length, 12.6–25.8 cm.; average, 21.5 cm.

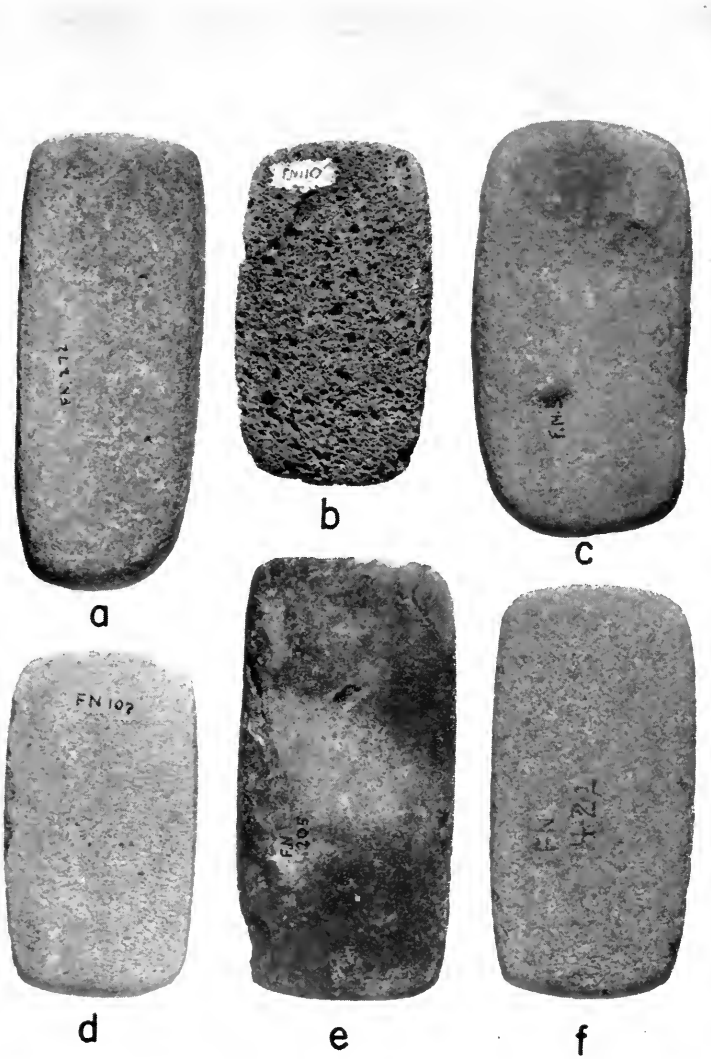


FIG. 32. Rectangular manos. Length of *f*, 21.8 cm.

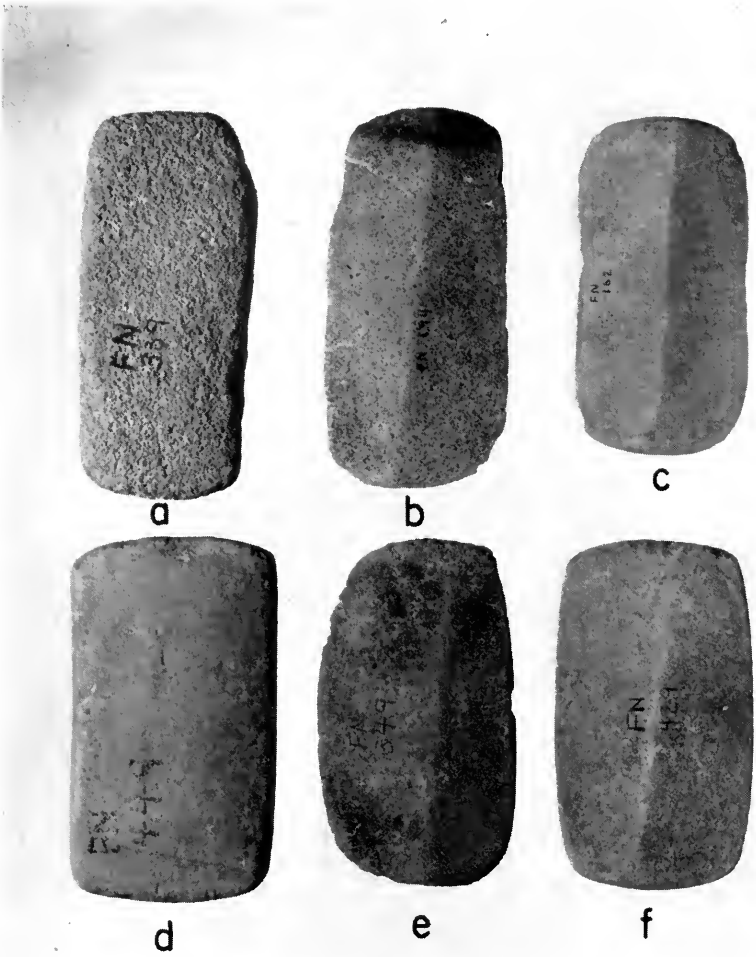


FIG. 33. Beveled and rectangular manos. Length of *f*, 18.6 cm.

Width, 8.2–15.1 cm.; average, 10.7 cm.
Thickness, 1.9–7.1 cm.; average, 4.3 cm.

(j) Rectangular in outline, surfaces parallel, one grinding surface slightly convex, the other convex 7

From Rooms A, C, G, J, K, floors; North Plaza Trench.
Lengths, 17.0, 26.3, (frag.), 22.5, 23.3, 23.1, 24.0 cm.
Widths, 8.9, 11.3, 10.1, 10.3, 11.9, 11.0, 10.9 cm.
Thicknesses, 3.5, 4.7, 3.0, 5.5, 6.5, 5.4, 5.4 cm.

(k) Rectangular in outline, surfaces parallel, one grinding surface flat, the other convex (figs. 32, *f*; 33, *a*) 20

From Rooms A, B, D, E, G, K, L, M, floors; Rooms B, C, D, E, J, fill.

Length, 15.7–23.5 cm.; average, 19.4 cm.

Width, 8.1–14.4 cm.; average, 10.3 cm.

Thickness, 2.7–7.0 cm.; average, 4.3 cm.

(l) Rectangular in outline, surfaces parallel, one grinding surface flat, the other slightly convex 19

From Rooms A, D, E, G, floors; Rooms A, C, H, J, North Plaza, fill.

Length, 16.1–24.5 cm.; average, 19.6 cm.

Width, 7.3–11.9 cm.; average, 10.1 cm.

Thickness, 2.5–6.7 cm.; average, 4.3 cm.

(m) Rectangular in outline, one grinding surface convex, the other beveled in a double plane with a longitudinal ridge between 6

From Rooms A, D, L, M, floors; Room B, fill.

Lengths, 18.0, 19.4, 22.5, 26.5 cm., (remainder fragments).

Widths, 11.4, 8.2, 8.7, 10.4, 9.8, 11.2 cm.

Thicknesses, 6.1, 4.0, 3.1, 3.2, 3.2, 3.2 cm.

(n) Rectangular in outline, one grinding surface slightly convex, the other beveled with a longitudinal ridge between (fig. 33, *e*) 3

From Room D, Floor 1; Room H, fill.

Lengths, 18.8, 18.5 cm., (frag.).

Widths, 10.5, 9.5, 10.6 cm.

Thicknesses, 3.2, 4.5, 2.9 cm.

(o) Rectangular in outline; one grinding surface flat, the other beveled with a longitudinal ridge between, triangular in cross section (figs. 33, *c*, *f*; 34) 26

From Rooms A, B, D, E, H, I, N, floors; Rooms A, B, C, F, G, J, North Plaza fill, Trench I.

Length, 15.6–23.8 cm.; average, 20.1 cm.

Width, 7.8–11.3 cm.; average, 9.7 cm.

Thickness, 1.9–6.9 cm.; average, 3.2 cm.

(p) Oval in outline, triangular in cross section; one grinding surface flat, the other beveled, with a longitudinal ridge between (fig. 31, center) 7

From Rooms B, E, G, I, floors; East Plaza Trench.

Lengths, 23.0, 21.5, 18.6, 19.4, 21.6 cm., (remainder fragments).

Widths, 9.1, 10.7, 9.6, 10.8, 9.3, 10.6, 8.1 cm.

Thicknesses, 2.5, 2.2, 3.8, 2.4, 3.1, 3.0, 3.1 cm.

(q) Rectangular in outline, lozenge shape in cross section, both grinding surfaces beveled 1

From Room G, fill (disturbed).

Length, (frag., present length 8.6 cm.).

Width, 8.4 cm.

Thickness, 2.3 cm.

Material: Rhyolite, calcareous sandstone, basalt, vesicular basalt.

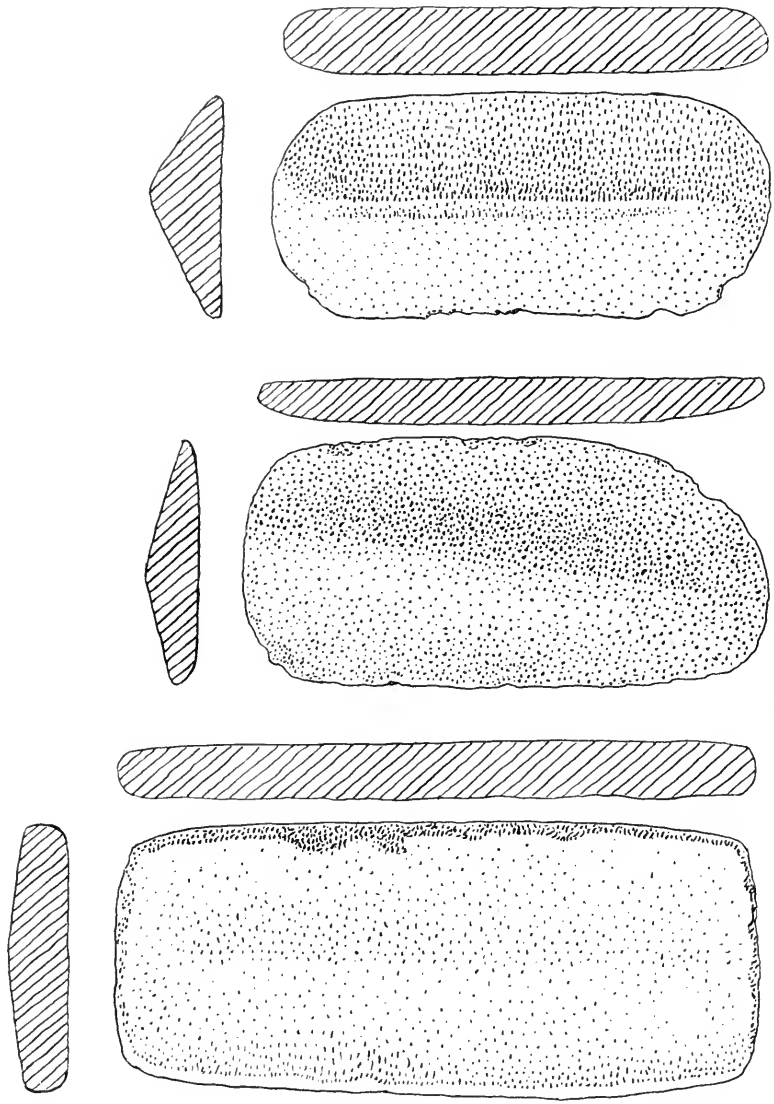


FIG. 34. Drawings showing process of wear on beveled manos; earlier stage at bottom, later stage at top.

Classification of Rubbing Stones

Rubbing stones with single rubbing surfaces:

(a) Oval in outline, surfaces parallel, rubbing surface convex (fig. 35, *f*) . . 5
From Rooms A, D, floor; Room A, North Plaza, fill.
Lengths, 6.5, 8.6, 11.0, 12.9 cm., (frag.).
Widths, 5.5, 6.6, 9.8, 9.6, 4.1 cm.
Thicknesses, 4.4, 6.0, 6.9, 5.8, 2.4 cm.

(b) Oval in outline, surfaces parallel, rubbing surface slightly convex (fig. 35, *c*) 2
From Room A, Floor 3; Room B, fill.
Lengths, 11.5, 9.2 cm.
Widths, 8.8, 8.5 cm.
Thicknesses, 3.4, 4.0 cm.

(c) Oval in outline, surfaces parallel, rubbing surface flat (fig. 35, *b*) . . . 7
From Rooms A, B, H, floors; Room B, North Plaza, fill.
Lengths, 9.0, 7.4, 7.9, 7.5, (frag.), 8.0, 12.0 cm.
Widths, 7.9, 6.2, 5.2, 7.7, 5.8, 7.7, 7.5 cm.
Thicknesses, 5.9, 2.5, 2.3, 5.6, 1.8, 2.7, 5.3 cm.

(d) Rectangular in outline, surfaces parallel, rubbing surface flat (fig. 35, *a*) 2
From Room G, Floor 3; Room E, fill.
Lengths, (frag.).
Widths, 4.4, 6.2 cm.
Thicknesses, 2.4, 1.8 cm.

Rubbing stones with two rubbing surfaces:

(a) Oval in outline, surfaces parallel, rubbing surfaces convex (fig. 35, *d*) . . 5
From Room E, fill; Trench I, Level 1.
Lengths, 7.4, 8.5, 7.5, 11.1 cm., (frag.).
Widths, 6.2, 5.6, 5.9, 5.8, 6.9 cm.
Thicknesses, 2.8, 2.0, 4.3, 2.9, 6.1 cm.

(b) Oval in outline, surfaces parallel, rubbing surface slightly convex (fig. 35, *e*) 3
From Rooms G, I, fill.
Lengths, 7.1, 8.0, 10.3 cm.
Widths, 5.4, 5.1, 7.6 cm.
Thicknesses, 1.5, 2.2, 2.7 cm.

(c) Oval in outline, surfaces parallel, rubbing surfaces flat (fig. 35, *g*) . . . 3
From Room B, fill; North Plaza, trench.
Lengths, 9.2, 9.5, 9.5 cm.
Widths, 5.4, 4.3, 8.4 cm.
Thicknesses, 2.4, 1.7, 4.8 cm.

(d) Rectangular in outline, surfaces parallel, rubbing surfaces flat (fig. 35, *h*) 5
From Rooms E, H, floors; Room D, fill.

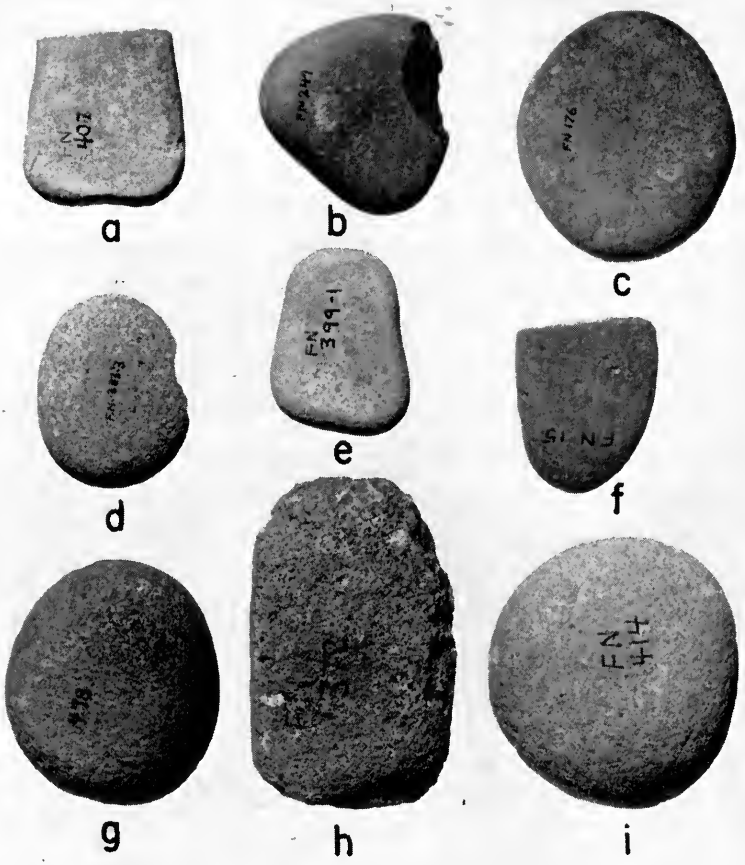


FIG. 35. Rubbing stones, miscellaneous types. Length of *i*, 10.6 cm.

Lengths, 6.2, 10.1, 12.9 cm., (remainder fragments).
Widths, 5.3, 4.1, 6.2, 7.3, 8.0 cm.
Thicknesses, 2.7, 3.1, 3.5, 5.1, 2.9 cm.

(e) Oval in outline, surfaces parallel, one rubbing surface convex, the other slightly convex (fig. 35, *i*) 1

From North Plaza trench.
Length, 10.6 cm.
Width, 9.6 cm.
Thickness, 5.7 cm.

(f) Oval in outline, surfaces parallel, one rubbing surface convex, the other flat 2

From Room D, North Plaza, fill.
Lengths, 12.1, 10.4 cm.
Widths, 11.1, 7.4 cm.
Thicknesses, 3.1, 2.4 cm.
Material: Rhyolite, limestone, calcareous sandstone, vesicular basalt.

Polishing Stones

Oval or roundish in outline with one or more smooth, flat, polishing surfaces (fig. 36) 19

From Rooms A, B, D, E, G, H, floors; Rooms E, H, fill; East Plaza, North Plaza, trenches.
Length, 3.3–7.0 cm.; average, 5.0 cm.
Width, 1.7–4.4 cm.; average, 3.4 cm.
Thickness, 0.5–2.5 cm.; average, 1.6 cm.
Material: Rhyolite, limestone, chalcedony, diabase, quartzite, dolomitic limestone.

Classification of Pestles

(a) Long, ovoid stone, shape unaltered from natural stone except for ends, which are rounded and battered; three specimens used on one end, three on both ends (fig. 37, *b*, *c*) 6

From Rooms A, E, Floor 1; Room A, Floor 2.
Lengths, 33.4, 16.3, 17.7, 21.3, 30.4, 12.8 cm.
Widths, 11.5, 8.6, 9.3, 11.0, 10.5, 9.4 cm.
Thicknesses, 9.7, 6.5, 6.2, 5.2, 8.1, 8.2 cm.
Material: Rhyolite.

(b) Oblong in outline; has two circular depressions, one in each of two flat, opposing surfaces, probably used as hand grips; one end convex, pecked and battered (fig. 37, *a*) 1

From Room G, Floor 2.
Length, 14.6 cm.
Width, 9.2 cm.
Thickness, 6.9 cm.
Material: Limestone.

FIG. 36. Polishing stones. Length of lower right specimen, 4.6 cm.

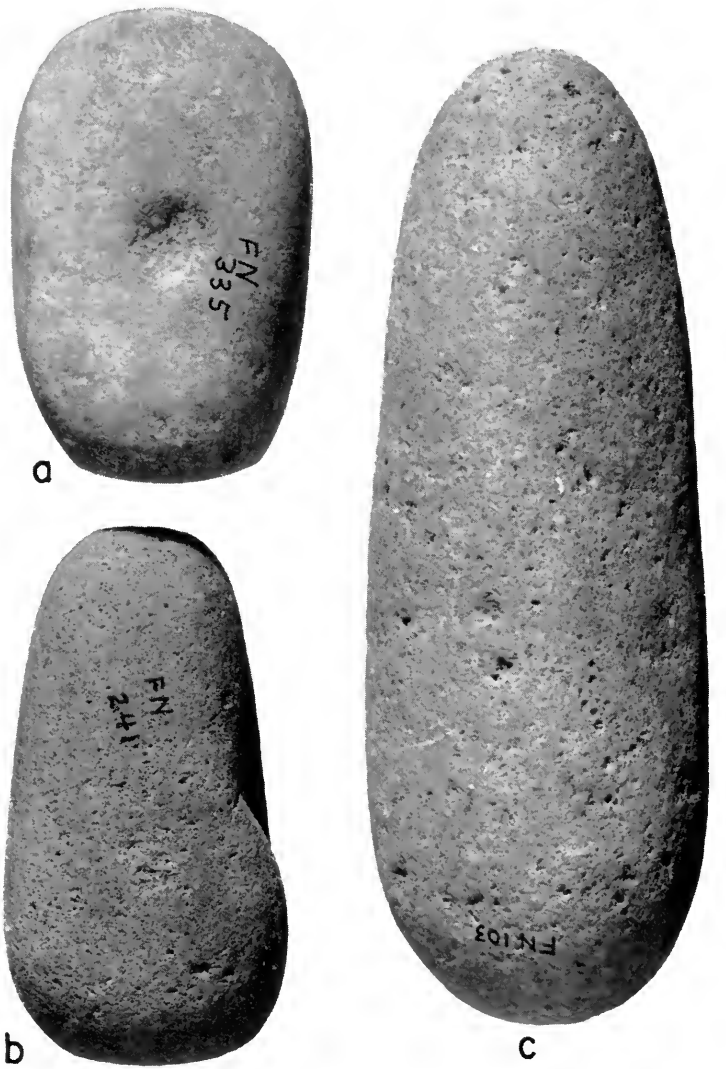


FIG. 37. Pestles. Length of *c*, 30.4 cm.

GRINDING STONES

The term "grinding stone" is used here to refer to metates, small metate-like grinding stones, paint grinding stones, paint palettes, stone bowls, and mortars. With the exception of the stone bowls and mortars, these classes of objects are thick or thin slabs of stone having one broad grinding surface which is usually concave or trough-shaped. The distinctions between certain specimens of the numerically larger classes of these nether grinding stones are, for the most part, just as subtle as those between the larger classes of handstones; for example, most of the small metate-like grinding stones are virtually the same as the small slab metates from the mealing bins and even the single atypical troughed small metate-like grinding stone is simply a smaller narrower version of a trough type metate. In spite of this similarity, there are certain physical differences that we have arbitrarily selected as a basis for classification. There was no evidence that they were used for the same purposes as metates, so we have followed the established precedent (Cosgrove, 1932, p. 38).

The paint grinding stones are more distinct in nature. They are made of smaller, thinner slabs, more irregular in outline and with rather rough surfaces beyond the paint-covered area. Moreover, these are different from the paint palettes, which are symmetrically shaped, polished smooth, and in one example decorated with a raised incised border.

Only one of the metates had a hole knocked through the trough-shaped grinding surface. This trait was found at Mogollon 1:15 (Haury, 1936a, p. 30) and at the SU Site (field notes and photograph). However, it seems to have been a more common custom to break up metates at Higgins Flat Pueblo. Of the 31 metates found, twelve were fragmentary and three others had been broken and the pieces were found separately. Our field catalogues reveal a large number of fragmentary metates from the SU Site, Turkey Foot Ridge Village, and other sites in the vicinity. The broken condition of as many as one third of the finds, even when the specimens were complete enough to be measured and classified, seems to suggest intentional breakage. That a similar situation prevailed at the Swarts Ruin seems to be indicated by the large proportion of fragments recovered there (Cosgrove, 1932, p. 35).

Red paint was observed on the grinding surfaces of two metates with the trough open at one end only. This corroborates evidence from O Block Cave and Cosper Cliff-Dwelling (Martin, Rinaldo,

and Bluhm, 1954) concerning the use of metates for grinding hematite (Stephen, 1936, pp. 396, 470).

Only two of the specimens classed as metates with trough-shaped grinding surface open at one end only are definitely of that type. The other three metates in this class are transitional specimens. The first two have a narrow flat ridge at the closed end; the other three have grinding surfaces that slope up much more sharply at the end towards the grinder than do the ordinary through trough metates. The troughs on all the metates are straight, the sides are parallel and, in general, the bottom of the trough is flat. Smooth and medium coarse surfaces predominate over coarse pecked surfaces on these metates. There appears to be no correlation between the texture of the surface and the depth of the trough or the thickness of the stone. In other words, there is no direct correlation between the presumably new, thick, shallow trough metates and a coarse grinding surface. The coarse grinding surfaces occur on the deep trough, thin metates also.

Distribution

Most of the whole metates came from the upper floors, most of the fragments from the lower floors and the fill. The most extreme example of trough metate open at one end only, came from the lowest floor (Floor 3) in Room A. The small metate-like grinding stones came from the fill and the upper floors. This would bear out their likeness to the slabs (metates?) in the mealing bins which were also predominantly on the upper floors, although remnants of bins which may have been mealing bins were found on the lower floors and numerous small metate-like grinding stones have been recovered from sites of earlier periods in this area.

The metate with trough open at both ends (through trough type) is the most common type recovered from Higgins Flat Pueblo; the type with trough open at one end only is much less common. This shift in popularity of the types is a continuation of the trend observed for the Reserve Phase—a trend which probably began during the Three Circle Phase (Martin and Rinaldo, 1950b, fig. 221). The common, short, broad through trough metates are like those from the Swarts Ruin (Cosgrove, 1932, p. 35) and from the Babocomari Village (Di Peso, 1951, p. 132). The through trough type metate is found among the Gila Basin Hohokam in a narrower variant (Sayles, *in* Gladwin and others, 1937, p. 116) and among the Anasazi and Sinagua from Pueblo II times and later (Bartlett, 1933, pp. 22,

26). It is rarely if ever found inclosed in a mealing bin. All of the metates in the Higgins Flat Pueblo mealing bins were simple slabs or small, metate-like grinding stones.

The milling stones from Higgins Flat Pueblo contribute evidence bearing out another trend. During the excavations it was noticed that an unusually large number of manos was being recovered. Analysis and comparison with the number of manos and metates recovered from other sites in the area indicate that more manos were found for each metate recovered in the later sites than in the earlier, even when rubbing stones are counted as one-hand manos. At the SU Site of the Pine Lawn Phase there were only two or three manos recovered for each metate. At the Turkey Foot Ridge Village the ratio was from three to four for each metate, from the Reserve Phase sites it was six, and from the Hinkle Park Cliff-Dwelling or the Higgins Flat Pueblo the ratio had increased to more than seven to one. At the same time there was also an increase in the number of mano types and a gradual but perceptible refinement in the shaping of these objects. In the earlier periods most of the shaping is that which resulted from use, in the later periods there appears to be more intentional shaping before use. These trends might be related to an increasing dependence on agriculture and a vogue for milled food products.

The painted slabs, the paint grinding slabs, the painted bowls, and the paint palettes are among the most interesting of the artifacts recovered. Although paint grinding stones have been recovered from the earliest levels and sites of the area, such as the Pre-Pottery levels in Tularosa Cave (Martin and others, 1952, p. 138) and the SU Site (Martin and Rinaldo, 1940, p. 60), Higgins Flat Pueblo is the first site from which we have recovered worked slabs and other objects of stone with painted decorations. Di Peso (1950, p. 63) and Watson Smith (1952, p. 269) have indicated that these painted slabs have predominantly a western and southern distribution during Pueblo III and Pueblo IV, particularly in the area inhabited by peoples thought to be ancestral to either the modern Hopi or the Zuñi Indians. Although many of these slabs or tiles are rectangular and almost twice as large as the Higgins Flat Pueblo specimens there are certain resemblances; for example, the use of the same colors—red, yellow, green and black—and the recurrence of the sun symbol, that is, circles with radiating lines (Voth, 1901, pp. 75, 76, pl. 42).

Painted bowls or mortars also have a late and southern distribution. They have been reported from the Swarts Ruin (Cosgrove,

1932, p. 32), from the Blue Post Office Ruin, from the Spur Ranch in the Upper Gila (Hough, 1914, p. 31), and from Pueblo Bonito (Pepper, 1920, p. 267). Four of these bowls (including the Higgins Flat Pueblo specimens) are circular, with convex outer walls and vertical inner walls, and they are decorated in the same colors of green, black, yellow and red; but here the resemblance ends. Those from Higgins Flat Pueblo are decorated with broad horizontal bands, those from the Blue Post Office Ruin and the Swarts Ruin with broad vertical panels.

The paint palettes or plaques appear to be related to the palettes of the Hohokam on the one hand (Haury, *in* Gladwin and others, 1937, pp. 121–126) and on the other to the lapstones of the Anasazi (Morris, 1939, p. 131). The small corner fragment with the channeled edge (medial groove) and raised incised border from Higgins Flat Pueblo (fig. 44) is similar to specimens found by Cosgrove (1932, pp. 51–55) at the Swarts Ruin and by Haury (1936b, p. 72) at the Harris Village. This fragment has the same shape and medial groove of the latter specimens but lacks the notches. In these the Higgins Flat Pueblo specimen is more like the specimen from the Spur Ranch (Hough, 1914, pp. 31–32). The other plain rectangular tablet or plaque from Floor 3 of Room E is more like the palette from Tseh Tso (Brand and others, 1937, p. 35) or the lapstones from BC 51 (Kluckhohn and Reiter, 1939, p. 62) and Pueblo Bonito (Pepper, 1920, p. 58). The use of these specimens as paint palettes is indicated by the residue of paint left in slight depressions on their surfaces, and this, in turn, combined with their rectangular tablet form and distribution, might indicate a similarity to the Hohokam palette.

Minute specks of paint appear on the inside of the painted bowls, but their smooth inner surfaces make it seem doubtful that they were used as paint mortars. It seems more probable that they were paint receptacles (Stephen, 1936, p. 497). Their association with other obvious ceremonial properties such as the painted animal effigies, the painted pipe, and the painted slab renders probable their use in a ceremonial context.

Classification of Metates

(a) Trough type, trough open at both ends; made of rough hewn blocks of stone; six specimens roughly oval in outline; eight specimens rectangular in outline, grinding surfaces pecked (figs. 38, 39)..... 15

From Rooms A, B, C, D, E, G, H, I, J, N, floors; Rooms C, G, H, fill.

Length, 39.5–55.0 cm.; average, 44.9 cm.
Width, 27.0–39.0 cm.; average, 32.2 cm.
Thickness, 9.0–17.5 cm.; average, 12.9 cm.
Width of trough, 19.0–30.0 cm.; average, 24.1 cm.
Depth of trough, 1.0–9.5 cm.; average, 4.1 cm.

FIG. 38. Rectangular through trough metate. Length, 50.5 cm.

(b) Trough type, trough open at one end only; made from roughly oblong blocks of stone; grinding surface trough-shaped, sides of trough straight; bottom of trough slopes up steeply at closed end; grinding surface pecked (fig. 40) 7

From Rooms A, E, H, floors; Rooms A, B, fill.
Lengths, 47.0, 39.0, 49.0, 46.0, 46.0 cm., (remainder fragments).
Widths, 30.5, 30.5, 38.0, 33.0, 40.0, 28.0 cm., (frag.).
Thicknesses, 9.0, 10.5, 10.0, 13.0, 9.0, 8.0, 7.0 cm.
Length of trough, 40.0, 32.5, 42.5, 42.0, 42.0 cm., (remainder fragments).

FIG. 39. Oval through trough metate. Length, 46.5 cm.

FIG. 40. Rectangular trough metate, open at one end. Length, 47.0 cm.

Width of trough, 23.5, 26.0, 26.5, 24.5, 26.5 cm., (remainder fragments).
Depth of trough, 6.0, 3.0, 8.0, 5.5, 7.0, 2.5, 5.0 cm.

(c) Fragments of trough type metates 9
From Room A, Floor 3; Rooms A, B, North Plaza, East Plaza, fill.
Thickness, 5.0–14.0 cm.; average, 9.3 cm.
Depth of trough, 1.5–6.0 cm.; average, 2.8 cm.

FIG. 41. Small metate-like grinding stones. Length of left specimen, 44.0 cm.

Classification of Small Metate-like Grinding Stones

(a) Small slabs of stone, rectangular or irregular in outline with a single shallow grinding surface (fig. 41, right) 4
From Rooms M, N, Floor 1; Rooms A, E, fill.
Lengths, 16.7, 23.1, 34.5, 31.8 cm.
Widths, 16.1, 21.3, 31.0, 27.5 cm.
Thicknesses, 5.1, 8.1, 6.5, 2.7 cm.

FIG. 42. Painted slabs. Length of lower specimen, 13.4 cm.

(b) Long oval in outline, trough shape, grinding surface open at both ends (fig. 41, left) 1

From Room E, Floor 1.
Length, 44.0 cm.
Width, 20.5 cm.
Thickness, 19.5 cm.
Trough length, 34.0 cm.; width, 13.5 cm.; depth, 2.0 cm.

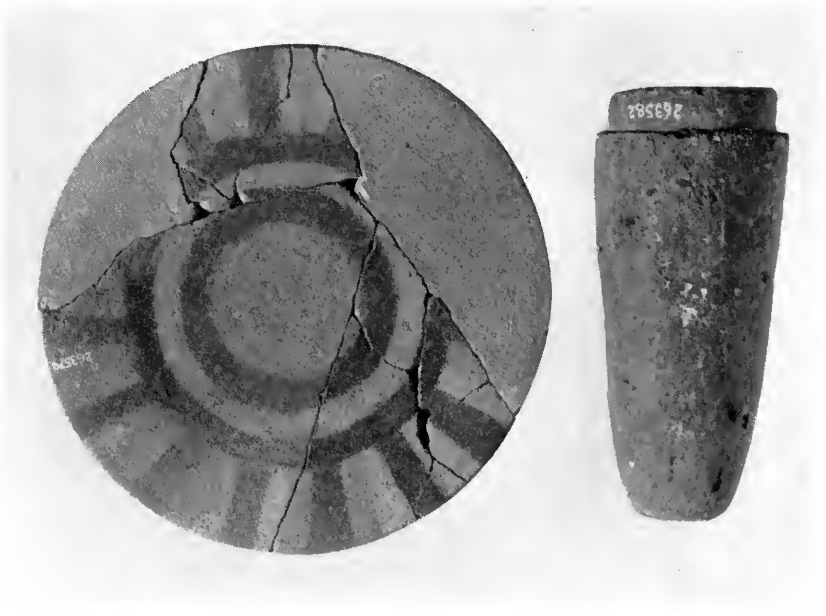


FIG. 43. Tubular pipe and painted slab. Length of pipe, 17.8 cm.

Classification of Painted Slabs and Paint Grinding Stones

Small, thin flat slabs of stone with paint remaining on limited areas of one or more surfaces; two specimens neatly and smoothly finished with distinct design areas, five rough with blurred design area margins, two definitely paint grinding stones (figs. 42, 43, 66) 9

From Rooms A, B, D, E, floors; Room D, fill.
Lengths, 11.6–26.4 cm.; average, 18.6 cm.
Widths, 7.7–21.4 cm.; average, 14.5 cm.
Thicknesses, 1.2–3.8 cm.; average, 2.0 cm.
Material: Rhyolite slabs with hematite pigment.

Paint Palette

Incised corner fragment of small carved slab; corner rounded, bordered by plain half-round raised ridge; edge channeled (fig. 44, *a*) 1

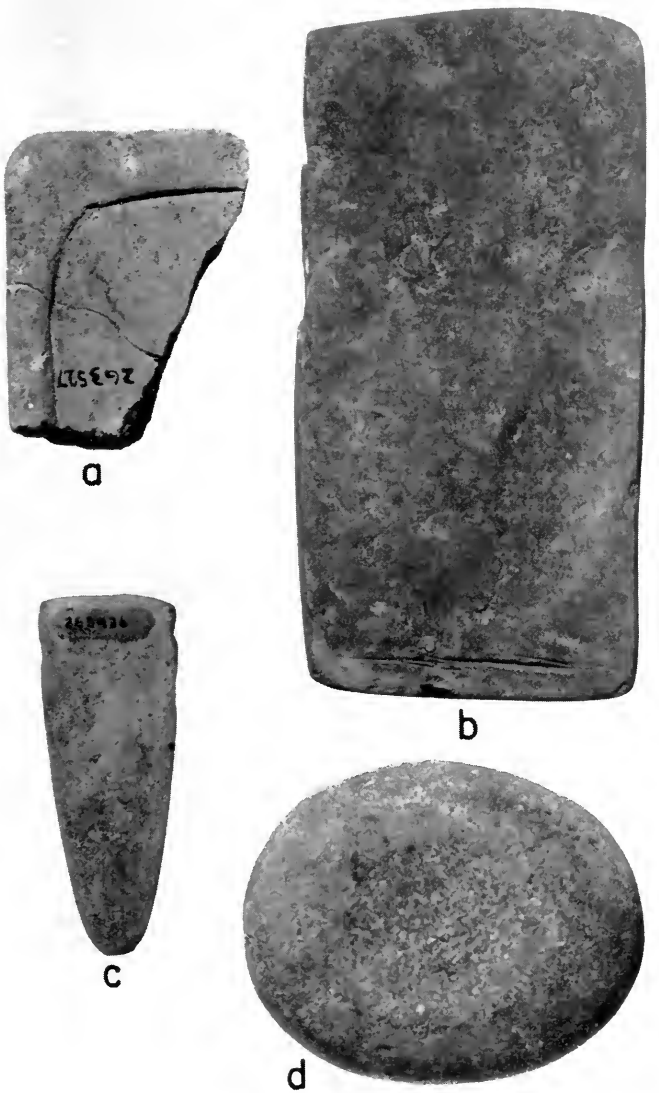


FIG. 44. Paint palette (*a*); lapstone (*b*); tchamahia (*c*); mortar (*d*). Length of *d*, 10.3 cm.

FIG. 45. Stone bowls from Room E. Diameter of right specimen, 11.3 cm.

From Room G, Floor 2.

Fragment, present length 7.7 cm.; width, 6.2 cm.; thickness, 1.3 cm.

Material: Indurated clay stone.

Lapstone

Finely worked and smoothed rectangular slab of stone; narrow straight incision 6.5 cm. long, parallel to and 1.0 cm. from end of stone (fig. 44, *b*) 1

From Room E, Floor 3.

Length, 18.1 cm.

Width, 9.1 cm.

Thickness, 1.2 cm.

Material: Slate.

Classification of Stone Bowls or Mortars

(a) Circular dishes with convex sides and deep cup-shaped depression in one face; bottoms flat; smooth and finely worked; traces of broad horizontal stripes in red, yellow and black on sides; bottom of one specimen painted red (figs. 45, 66) 2

From Room E, Floor 1.

Diameter, 15.0, 11.3 cm.

Height, 6.5, 4.6 cm.

Depth of cup, 4.0, 3.0 cm.

Material: Tuff.

(b) Fragments of stone bowls with rough and pitted surfaces (not illustrated) 2

From Room C, floor; Room E, fill.

Lengths, 12.8, 10.2 cm.

Widths, 7.2, 7.1 cm.

Thicknesses, 5.2, 2.1 cm.

(c) Oval in outline, lower surface convex, upper surface contains a shallow circular smooth depression with traces of red pigment (fig. 44, *d*).. 1

From Room E, Floor 3.
Length, 10.3 cm.
Width, 8.5 cm.
Thickness, 3.9 cm.
Diameter of cup, 5.0 cm.; depth of cup, 0.2 cm.
Material: Quartzite.

WORKED SLABS

Discussion

In addition to the small painted slabs a number of large smooth worked slabs were recovered. The count recorded below includes only whole specimens and the larger fragments for which identification was certain, because it was impossible to distinguish between small fragments of worked slabs and small fragments of dressed building slabs. Some of the slabs that had been built into the walls of composite construction were very similar to the slabs classed as worked slabs, and they may have been used as door slabs, cooking slabs (griddles), or deflectors for firepit and fresh air duct systems. The position of three of these worked slabs in central locations on room floors—one on top of the firepit in Room E, Floor 1, for example—raises the possibility that they were used to close hatchways in the ceilings. One of these supposed hatchway or door slabs was circular. The use of circular slabs as door coverings apparently has a southern and western distribution and they have been found at Hawikuh, Halona, etc. Their use is discussed by Mindeleff (1891, pp. 192–194) and by Smiley (1952, pp. 56–57).

Classification of Worked Slabs

(a) Thin stone slabs, rectangular in outline, surfaces generally smooth, edges occasionally flaked to outline (fig. 46)..... 9

From Rooms C, D, E, floors; Room B, fill.
Lengths, 70.0, 50.0, 150.0, 43.0 cm., (remainder fragments).
Widths, 35.0, 50.0, 27.0, 50.0, 50.0 cm., (remainder fragments).
Thicknesses, 1.2–9.8 cm.; average, 3.7 cm.

(b) Thin stone slab, circular in outline, surface smooth, edges flaked to outline..... 1

From Room H, Floor 1.
Diameter, 35.3 cm.; thickness, 2.6 cm.

CORN MOUNDS OR CONES

Two carefully worked stone objects of elongated cylindrical shape tapering to a rounded or sub-conical apex and with flat bottoms may be compared to similar objects from the Village of the Great Kivas near Zuñi (Roberts, 1932, pp. 61, 143), from the Hilltop Ruin in the Mimbres area (W. Smith, 1952, p. 233, footnote), from Mesa Verde (Fewkes, 1911, p. 67; O'Bryan, 1950, p. 85), and from the Gallina area at the Evans Site (Lange, 1944, pp. 446–448). Smith and Lange discuss the distribution and use of these objects. In historic times they have been used on Hopi altars (Dorsey and Voth, 1901, pl. 18) and are now used to support objects such as crooks, standards, or feathers. For this purpose they frequently have a hole drilled in the top. The Higgins Flat specimens were made of a vesicular tuff and so such holes were furnished naturally. However, these cones lacked any concavity in the base, a feature which is occasionally but not invariably present (Roberts, 1932, p. 143). They are sometimes painted or studded with kernels to resemble actual corn ears (Voth, 1912, pp. 52–53), although there is nothing remaining on the Higgins Flat specimens to indicate they were treated in this manner.

Classification of Corn Mounds or Cones

Carefully worked stones of elongated cylindrical shape tapering to a rounded or sub-conical apex (fig. 47) 2

From Room B, Floor 1; Room D, fill.
Heights, 33.5, 29.0 cm.
Diameters, 19.5, 17.5 cm.
Material: Vesicular tuff.

HAMMERSTONES

Hammerstones, or, as they are sometimes called, pecking stones, are one of the tools found in quantity on all sites in the Southwest. They grade from round stone balls to sharp angular cores that are similar to choppers. They are most frequently made of a hard material. They are battered and chipped and show other evidence of hard use. Presumably they were used for sharpening the surfaces of grinding stones, which show many little pits or dimples in their grinding surfaces. At least such was their use in historic times (Hough, 1919, p. 270). They might also have been used as tools for crude percussion chipping of scrapers, choppers, and other flaked tools.

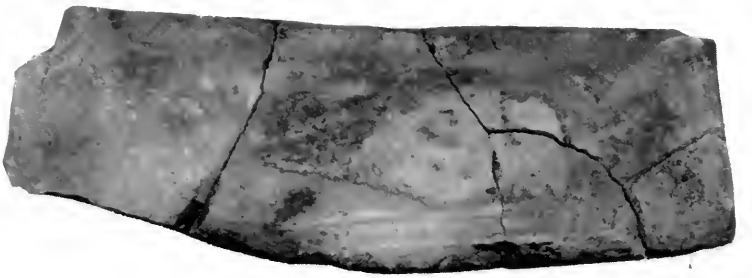


FIG. 46. Worked slab. Length, 150 cm.

FIG. 47. Corn mounds or cones. Height of left specimen, 33.5 cm.

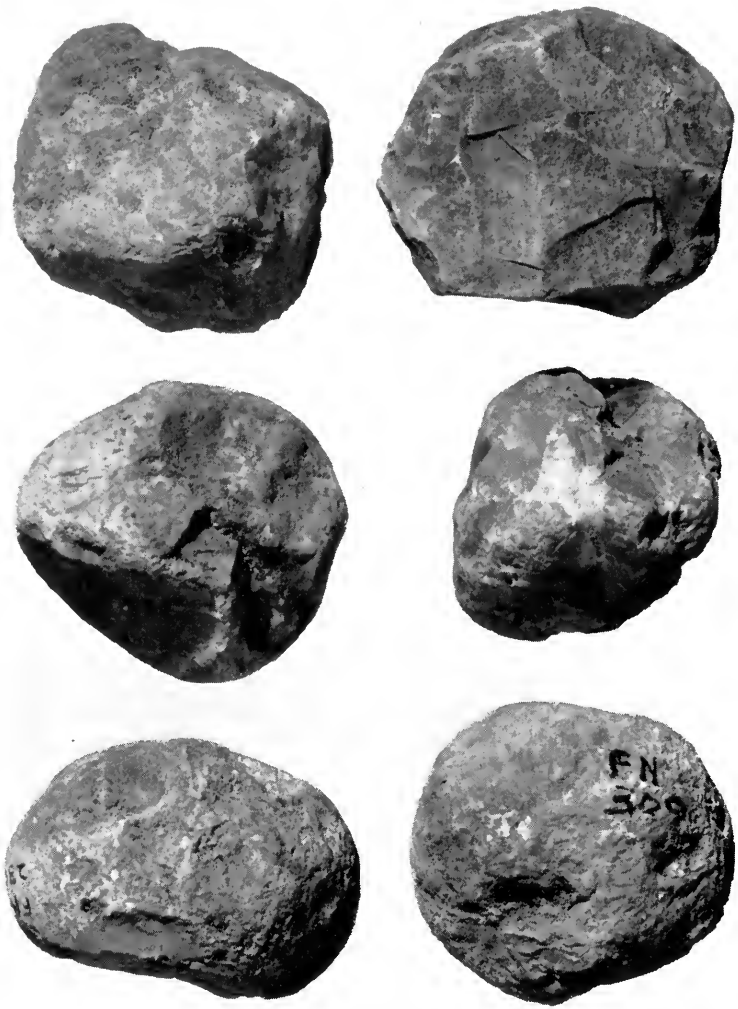


FIG. 48. Hammerstones. Length of lower right specimen, 7.4 cm.

Classification of Hammerstones

Battered and chipped pebbles, roughly oval to round in outline (fig. 48) 13

From Rooms A, D, I, floors; Rooms A, D, fill.

Lengths, 6.5–10.4 cm.; average, 7.7 cm.

Widths, 5.7–8.9 cm.; average, 6.7 cm.

Thicknesses, 4.9–7.2 cm.; average, 5.9 cm.

Materials: Rhyolite, chalcedony, glassy rhyolite, quartz, jasper, flint, limestone, green chalcedony.

GROOVED TOOLS

More axes were recovered from Higgins Flat Pueblo than from the earlier sites in the Reserve area. There is little indication that they were more carefully made than the earlier specimens, although it seems probable from the greater number of intact cutting edges that they were more carefully used, and possibly that there had been a shift away from the practice of resharpening axes by flaking the cutting edge.

These axes might be classed in several different types. Short bits are present on both three quarters grooved and full grooved specimens. However, the small three quarters grooved specimen appears to have been resharpened, inasmuch as there is a ridge bordering the lower edge of the groove. On the other two complete specimens the channel is located about two-thirds of the length of the ax from the cutting edge. Remnants of pecked, and in one instance a polished poll surface are to be seen on four out of the six specimens, indicating that they were artificially shaped; but the polls on all specimens are battered and broken as if they had been used as hammers. One specimen is channeled on the inner edge for a "J-haft." The battered condition of the cutting edge on another specimen, which also happens to be rectangular in cross section, makes it impossible to tell whether the specimen was originally shaped in ax form or not. It certainly had been used as a hammer or a maul, possibly to break up building stone. Evidence for such a practice with worn out axes was found by Haury at Pinedale (Haury and Hargrave, 1931, p. 53). The axes were probably used for wood working, such as cutting beams and slabs for the roofs.

One of the mauls from Higgins Flat Pueblo was full grooved; the other two have a section of one surface broken off in the area of the groove and so it is impossible to tell whether the groove completely encircled the tool or not. On two of the specimens the groove encircles the middle; on the third specimen the channel is

located about one third of the total length of the specimen from one end. Both ends of these mauls are battered and pitted and appear to have been used for pounding. They may have been used for breaking off dead limbs for firewood.

Distribution

Full grooved axes have been recovered from Anasazi sites dating about A.D. 750 and slightly later (Modified Basketmaker to Developmental Pueblo) (Brew, 1946, p. 239; Gladwin, 1945, p. 26; Martin, 1939, p. 410), although they are more characteristic of the Great Pueblo period, the notched ax being more typical earlier among the Anasazi (Brew, 1946, p. 239; Rinaldo, 1950, p. 101). The earliest instance of the full grooved ax from Mogollon sites is those from the San Francisco Phase pit-houses of Starkweather Ruin (Nesbitt, 1938, pp. 127, 103). Three more were recovered from the much later Reserve Phase site of Wet Leggett Pueblo (Martin and Rinaldo, 1950b, p. 480).

The source for three quarters grooved axes for the Mogollon was probably the Hohokam (Reed, 1951, p. 45; Gladwin and others, 1937, p. 115); but for the whole Southwest the ultimate source was probably farther to the south. Three quarters grooved axes have been recovered from prehistoric Hopi and Zuñi sites (Haury and Hargrave, 1931, pp. 22, 53; Baldwin, 1939, p. 318; Wendorf, 1950, pp. 58–60; Roberts, 1932, p. 141). In the Reserve area they have been recovered from Turkey Foot Ridge Village (Martin and Rinaldo, 1950a, p. 334), a Reserve Phase site (Martin and Rinaldo, 1950b, p. 480), Starkweather Ruin (Nesbitt, 1938, p. 127), and Hinkle Park Cliff-Dwelling (Martin, Rinaldo and Bluhm, 1954). However, they occur with greater frequency to the south in the Mimbres Phase (Cosgrove, 1932, p. 41; Nesbitt, 1931, p. 78).

Full grooved mauls are present early in Anasazi (Roberts, 1929, p. 134) and in Mogollon (Martin and Rinaldo, 1940, p. 56) and at least one has been recovered from the Cochise (Sayles and Antevs, 1941, pl. IX). This type of maul is not found on Hohokam sites; it is a distinctive trait of the Anasazi and Mogollon cultures. On all Mogollon sites of the Reserve area it is much more frequent than the three quarters grooved type (Martin and Rinaldo, 1940, p. 56; 1947, p. 340; 1950a, p. 334; Nesbitt, 1938, p. 102). The three quarters grooved type was the only one found at Snaketown (Sayles *in* Gladwin and others, 1937, p. 104).

Classification of Axes

(a) Three quarters grooved type, with a short poll, one with blade ground and pecked to shape, the other polished; channel and poll pecked (fig. 49, *b*, *c*) 3

From Room A, Floors 1, 2.
Lengths, 11.4, 15.8 cm., (frag.).
Widths, 8.0, 7.2, 7.2 cm.
Width of grooves, 3.2, 3.2 cm., (frag.); depth, 1.3, 0.7, 0.4 cm.
Material: Diabase.

(b) Full grooved type, with long battered polls; two with short blades; one with long blade ground and polished to sharp cutting edge (fig. 49, *d–f*) 3

From Rooms G, D, floors; Room J, fill.
Lengths, 20.9, (frag.), 12.0 cm.
Widths, 9.1, 6.8, 6.1 cm.
Thicknesses, 4.5, 6.8, 6.3 cm.
Width of grooves, 2.4, 2.2, 2.4 cm.; depth, 0.6, 0.6, 0.7 cm.
Material: Diabase.

Classification of Mauls

Full grooved type; roughly oval stones in outline with wide, shallow groove encircling the middle; one specimen with groove located near one end (fig. 49, *g–i*) 3

From Trenches, Room D, fill.
Lengths, 9.9, 16.1, 14.9 cm.
Widths, 8.8, 8.2, 8.8 cm.
Thicknesses, 7.6, 6.5, 7.6 cm.
Width of channel, 2.0, 2.0, 2.5 cm.
Materials: Vesicular basalt, limestone.

ARROW SHAFT TOOLS

Discussion

The arrow shaft tools all have polished grooves and are therefore of the straightener rather than the arrow shaft smoother type. The grooves run across the narrow dimensions of the stone except on one specimen which has on each surface a single groove, one of which runs transverse and the other lengthwise of the specimen. Only one specimen, which appears to have been made from a small mano, is artificially shaped; the others are made from river pebbles or other naturally shaped stones. Their grooves are U-shaped and scored longitudinally. Two specimens have two grooves on one surface, the remainder a single groove. Although two specimens with grooves of the same width were found on Floor 2 of Room A, the depths of their grooves are so slight as to make it improbable that they could have been used as a pair.

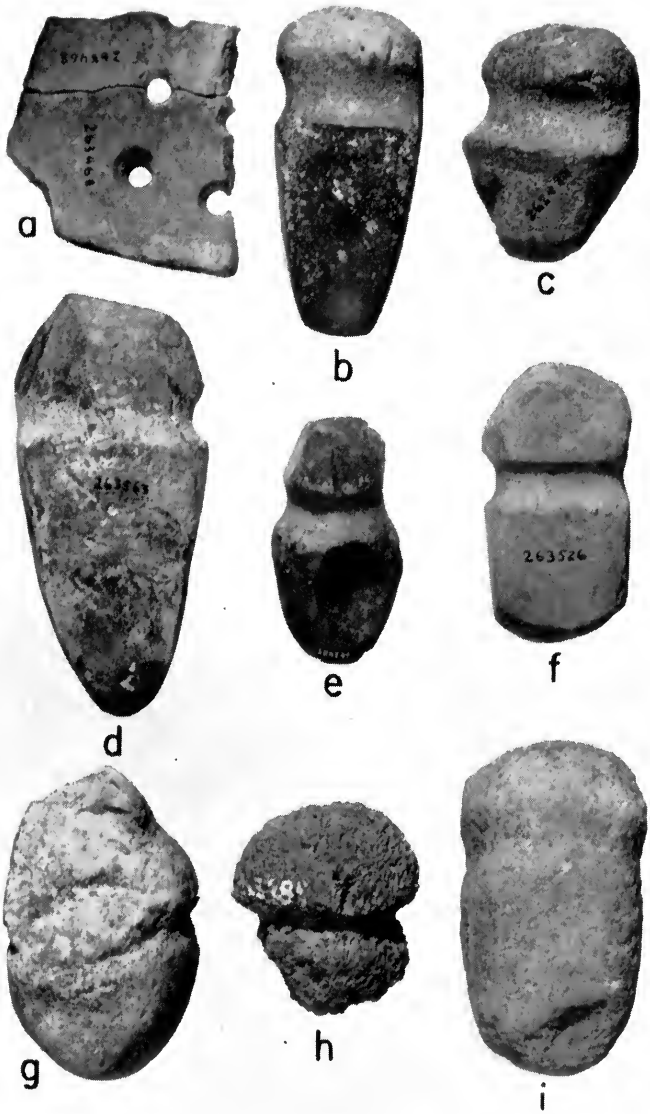


FIG. 49. Colander (*a*); axes (*b–f*); mauls (*g–i*). Length of *i*, 16.1 cm.

Distribution

Arrow shaft tools were recovered from all levels of the pueblo. Several have been reported before from the Reserve area—from Starkweather Ruin (Nesbitt, 1938, p. 104), from the Reserve Phase sites (Martin and Rinaldo, 1950b, p. 476), and from Hinkle Park Cliff-Dwelling (Martin, Rinaldo and Bluhm, 1954). They have been recovered here and elsewhere primarily from sites that would date about A.D. 1000 or later. The arrow shaft straighteners are more limited in their distribution than are the arrow shaft smoothers. The distribution of the straighteners is concentrated within Arizona and New Mexico (Toulouse, *in* Kluckhohn and Reiter, 1939, p. 86).

Classification of Arrow Shaft Tools

Oval or naturally shaped pebbles with one or two polished grooves across a broad surface at right angles to the long axis of the stone (fig. 50, *a–g*) 7

From Rooms A, C, I, M, floors; Rooms A, C, fill.
Lengths, 10.9, 10.6, 6.4, 8.0, 7.9, 9.4, 12.3 cm.
Widths, 9.6, 8.5, 5.6, 7.1, 4.9, 7.0, 6.1 cm.
Thicknesses, 5.2, 1.3, 2.9, 4.3, 1.7, 4.2, 4.5 cm.
Width of grooves, 0.7, 0.7, 0.8, 0.7, 1.4, 1.4, 1.0 cm.
Materials: Limestone, rhyolite, fine-grained calcareous sandstone.

TCHAMAHIA(?)

Discussion

This implement is much smaller than the smallest celt-like implements called "tchamahias" in the literature (Stephen, 1936, pp. 625, 687). In shape it is broadly similar to a bone object found by Fewkes (1904, p. 57) and averred by his Indian workmen to be part of a stick swallower's stick. Because there are shallow notches on each side of the broad end of the Higgins Flat Pueblo specimen, and because this end is thinner in the middle, it seems probable that the implement might have been hafted. It has been carefully finished and the edges are smooth and symmetrical. This artifact could also be a surrogate in polished stone for a chipped stone blade.

Classification of Tchamahia

Thin flat stone of celt-like shape, with three edges and end ground smooth; shallow notches in edges near broad end (fig. 44, *c*) 1

From Room A, trench along west wall.

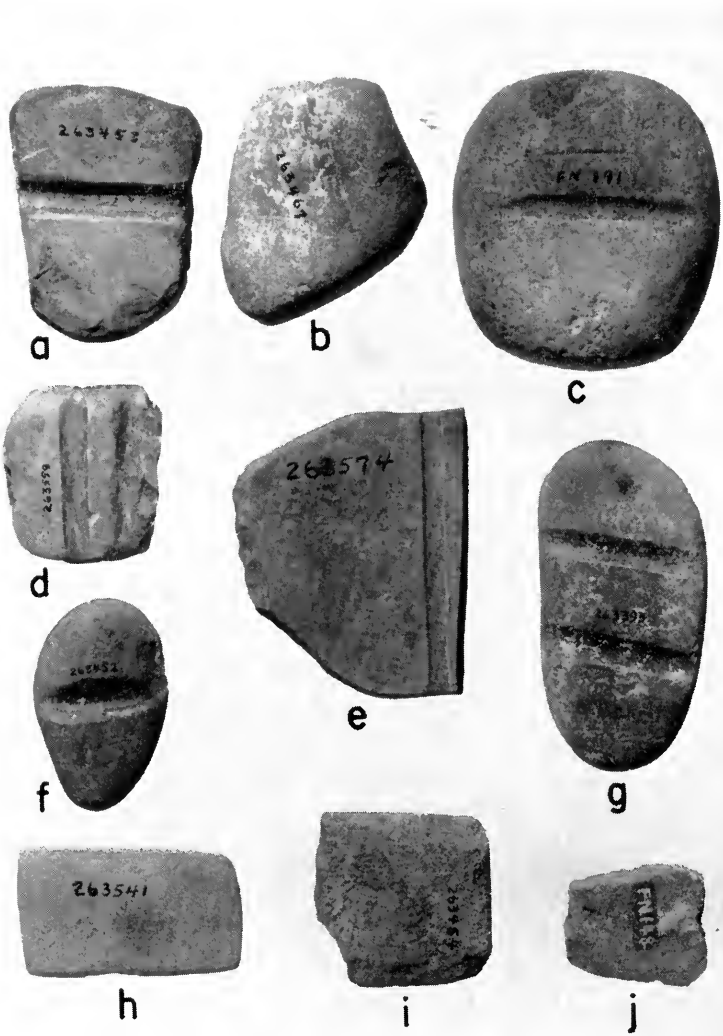


FIG. 50. Arrow shaft tools (*a–g*); smooth saws (*h–j*). Length of *i*, 5.2 cm.

Length, 9.6 cm.
Width, 5.6 cm.
Thickness, 0.5 cm.
Material: Indurated clay stone.

SMOOTH SAW OR FLESHING KNIFE

These rectangular sharp-edged implements must have been used for sawing or cutting. Two implements of this type from Tularosa Cave (Martin and others, 1952, p. 144) and one from Hinkle Park Cliff-Dwelling (Martin, Rinaldo and Bluhm, 1954) were classed as abrading stones, but are probably saws. These have also been noted from the Swarts Ruin and the Hilltop Ruin (Cosgrove, 1932, p. 46). The Cosgroves experimented with them in cutting bone and found them an effective tool for this purpose (Cosgrove, 1932, p. 46). The largest of these small saws overlap the type of tool classed as fleshing knives or hoes from Babocomari Village (Di Peso, 1951, p. 150) and from Los Muertos, a Hohokam ruin of the Classic Period (Haury, 1945a, p. 135, pl. 51). They are not plentiful in the Mimbres valley (Cosgrove, 1932, p. 46) or the Reserve area.

Classification of Smooth Saws

Small thin rectangular slabs of grit stone, wedge shape in cross section with one edge beveled in two planes, all edges and surfaces ground smooth (fig. 50, *h–j*) 3

From Rooms A, I, Floor 2; from Trench II.
Lengths, 8.2, 5.2, 6.3 cm.
Widths, 4.8, 4.6, 6.7 cm.
Thicknesses, 0.9, 1.1, 1.0 cm.
Material: Calcareous sandstone.

ABRADING STONES

Discussion

The use of these objects is problematical. They are similar to manos and rubbing stones in shape but lack their grinding surfaces, are made of fine vesicular pumice, and are much more symmetrical (fig. 51, *f*). The corners of most of these specimens are square and sharp, whereas those of the manos are blunt and rounded. These objects are all rectangular in outline. Similar objects were recovered from Los Muertos (Haury, 1945a, p. 129, pl. 40) and are called abrading stones.

Classification of Abrading Stones

Rectangular in outline, rectangular in cross section; all surfaces flat or slightly concave (fig. 51) 7
From Rooms A, C, D, E, floors; Rooms C, D, fill.
Lengths, 7.7, 10.2, 9.1, 6.3, 12.4, 10.9, 9.5 cm.
Widths, 9.1, 7.5, 6.5, 4.8, 7.7, 9.5, 5.0 cm.
Thicknesses, 4.8, 4.7, 3.6, 1.2, 4.2, 4.7, 2.3 cm.
Materials: Pumice, vesicular basalt.

STONE ANIMAL EFFIGIES

Discussion

The two stone animal effigies were found in association with the circular painted slab, the painted pipe and the painted stone bowl on Floor 1 of Room E. On the same floor, but not in direct association, another smaller painted stone bowl was found. This too is believed to belong with this group of objects. A small fragment of the painted slab had also become separated from the group, and it is clear that there had been some minor disturbance of these objects. They most clearly had been left in a group in the vicinity of the firepit, and there was another large worked stone slab near-by. Possibly this was a hatchway cover which fell in on the firepit when the roof caved in. By analogy to modern Hopi and Zuñi usage all of these objects appear to have functioned as part of altar paraphernalia (Stephen, 1936: slabs or tiles, p. 784; big pipe, p. 681; animal effigies, pp. 245, 291). This is also indicated by their provenience and their careful workmanship and painted decoration, which is unusual on utilitarian objects.

Distribution

A specimen similar to the larger animal effigy (bear?) from Higgins Flat Pueblo is reported by Hough (1914, p. 32) from the upper San Francisco River. This also has a receptacle in the back. Another, without the little box in the back but of the same general shape and size, was reported from Arizona W:10:51 near Point of Pines (Wendorf, 1950, p. 68). In this relation it is interesting to note that Hough reports a complex of objects consisting of a ceremonial painted mortar, a painted slab, and a painted shouldered cloud blower from a ceremonial room in the Spur Ranch Ruin located on the upper San Francisco River (Hough, 1914, pp. 31, 114). A painted stone slab was also found in the same site (Arizona W:10:51) as the stone animal effigy referred to above.

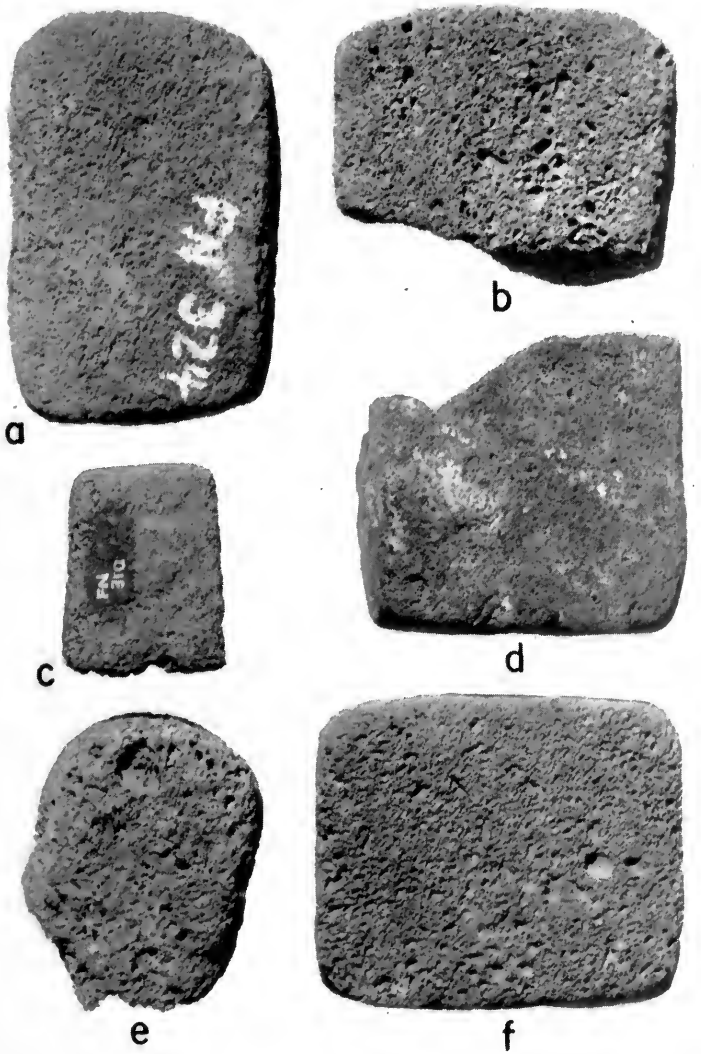


FIG. 51. Abrading stones. Length of *f*, 10.9 cm.

FIG. 52. Stone animal effigies. Length of left specimen, 13.0 cm.

Classification of Stone Animal Effigies

One with short stubby legs, ears, tail and snout, also a corpulent torso; no eyes or nostrils depicted; rectangular box recessed in center of back (6.3 cm. long, 5.3 cm. wide, 2.5 cm. deep). Traces of rainbow pattern on sides and legs run across snout; colors are black, red, green-blue and yellow. Length, 19.7 cm.; width, 11.0 cm.; height, 12.7 cm. (fig. 52, right).

Second apparently made to lie on back with paws in air (back flattened, belly recessed). Has short legs and tail, head and neck long; eyes and mouth carved. Colors black, red and yellow. Length 13.0 cm.; width, 10.5 cm.; height, 7.8 cm. (fig. 52, left).

Material: Tuff.

Classification of Pipe

Tubular, round, slim, tapers slightly from bowl end to mouth end; bore becomes progressively smaller towards mouth end, tapers to small hole 0.8 cm. diameter, 4.0 cm. from mouth end; groove or shoulder offset at bowl end. Painted stripes run lengthwise in black, red, green and yellow. Length, 17.8 cm.; greatest diameter, 7.6 cm.; least diameter, 4.5 cm. (fig. 43, right).

Material: Tuff.

COLANDER(?)

A small slab of grit stone (calcareous sandstone) was found on the floor of Room C. This slab once had six holes drilled in it. The holes were made by drilling through from both sides. Two of the edges are finished and fairly straight, and the holes are roughly

in lines parallel to these edges. It appears to be part of a larger worked slab. The purpose of this object is unknown. It is termed a colander here after Nesbitt, who found a similar object in the Mattocks Ruin (Nesbitt, 1931, p. 87). The specimen from Higgins Flat Pueblo is 12.3 cm. long, 10.6 cm. wide, and 2.2 cm. thick (fig. 49, *a*).

STONE ORNAMENTS

Stone pendants and beads are more rare than shell in the Reserve area. The pendants are for the most part plain tabular pendants keystone-shaped in outline with a hole drilled near one end. The single stone bead is of the disc type and is made of turquoise. These types are found throughout the Southwest in all levels and have no particular significance as horizon markers.

Classification of Stone Pendants

(a) Keystone-shaped in outline, perforated near narrow end (fig. 59, *e*, *f*) . 2
From Rooms A, J, floors.
Lengths, 1.7, 2.6 cm.
Widths, 1.5, 1.5 cm.
Thicknesses, 0.2, 0.4 cm.
Materials: Turquoise, malachite.

(b) Small rectangular block of sandstone with three quarters groove partially encircling it located about one third of the length from the upper end (fig. 59, *b*) 1
From Room C, floor.
Length, 4.8 cm.
Width, 2.2 cm.
Thickness, 2.1 cm.
Material: Calcareous sandstone.

Classification of Bead

Small disc bead 1
From Room A, Floor 1.
Diameter, 0.2 cm.
Thickness, 0.1 cm.
Material: Turquoise.

PROJECTILE POINTS

Discussion

The projectile points (including blades) from Higgins Flat Pueblo have few attributes in common. The similarity between

points is of a general nature; for example, one group of points is small and triangular, another is diagonal-notched, and still another has no notches and is generally oval in outline (blades). However, the differences in size, shape of the edges, general proportions, and other attributes are such that each of the Higgins Flat Pueblo specimens might be put in a separate category or type, if they had been discovered in the frequencies that they were from the caves of the Reserve area.

The chipping is generally good. A few points show exceptional artistry, and a few, mostly blades, were carelessly fashioned. On the other hand, the materials of which the projectile points were made—chalcedony, jasper and obsidian—are more easily worked than the basalt of which most of the blades were made, and this may account for the difference.

Some of the triangular points are of the size called "bird points" and these are the size and general type which have been recovered attached to prehistoric arrow shafts of this region (Cosgrove, 1947, p. 63, figs. 76, 131; Hough, 1914, pp. 64–65). Some of the larger diagonal-notched points were more probably dart points, inasmuch as similar points have been recovered in place on atlatl dart foreshafts (Martin and others, 1952, p. 107, fig. 136).

Distribution

Projectile points and blades of the types and patterns represented at Higgins Flat Pueblo occurred generally in the later levels of the caves excavated in the Reserve area, and at Hinkle Park Cliff-Dwelling. However, two fragmentary points with straight bases and straight to slightly convex edges, with the basal parts of the edges distinct and straight, are more characteristic of the Pine Lawn Phase and the Georgetown Phase. There are more small points than large points in the collection and more small points of the triangular class than of any other class.

Classification of Projectile Points and Blades

TYPE B

Diagonal notched points, expanding stem narrower than shoulder; down raking barbs, straight base, edges convex or straight (fig. 53, *g, h, j*) 4

From Rooms A, D, Floor 1; Room A, fill.
Lengths, 5.7, (fragments over 3.3), 2.5 cm.
Widths, 3.0, 2.8, 2.4, 1.1 cm.

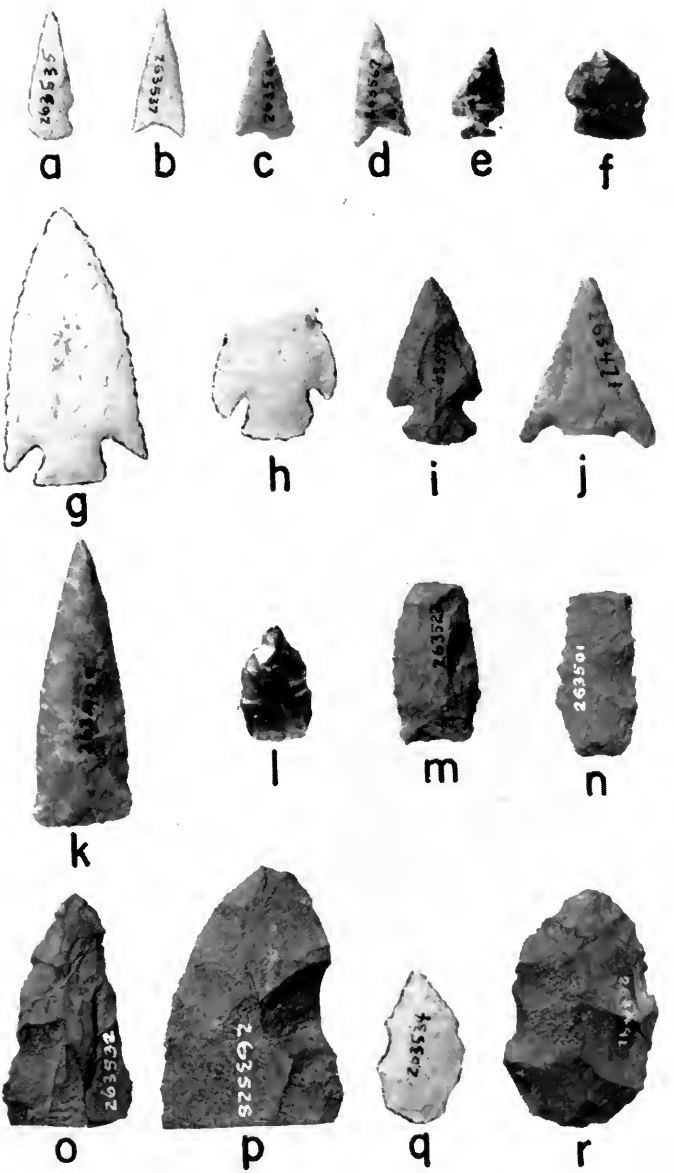


FIG. 53. Projectile points, miscellaneous types. Length of *r*, 5.0 cm.

Thicknesses, 0.5, 0.4, 0.4, 0.2 cm.
Materials: Chalcedony, flint, obsidian.

TYPE S

Small, triangular, edges straight, three specimens with indented base, one lateral notched (fig. 53, *a–d*) 4

From Rooms H, I, L, floors.
Lengths, 2.2, 2.5, 2.6, 2.3 cm.
Widths, 0.9, 1.2, 1.1, 1.3 cm.
Thicknesses, 0.2, 0.2, 0.1, 0.2 cm.
Materials: Chalcedony, flint, jasper.

TYPE L

Straight base, slightly convex to straight edges, basal parts of edges distinct and straight, edges serrate on one specimen (fig. 53, *m–n*). 2

From Room E, Floor 3; Room F, fill.
Lengths, (fragments over 3.2 cm.).
Widths, 1.7, 1.7 cm.
Thicknesses, 0.8, 0.8 cm.
Materials: Fine-grained basalt, fine-grained rhyolite.

TYPES E, F

Shallow lateral notches, base straight, slightly expanding base narrower than shoulder, one large, one small (fig. 53, *f, k*) 2

From Room A, fill.
Lengths, 6.0, 2.0 cm.
Widths, 2.1, 1.7 cm.
Thicknesses, 0.6, 0.5 cm.
Materials: Obsidian, dark chalcedony.

TYPE H

Lateral notched, expanding stem narrower than shoulder, lateral barbs, convex base, slightly convex edges (fig. 53, *i*) 1

From North Plaza trench.
Length, 3.5 cm.
Width, 2.0 cm.
Thickness, 0.5 cm.
Material: Fine-grained basalt.

TYPE M

Leaf-shaped blades with convex edges and convex bases, one with straight base; notch midway up one edge of three specimens (fig. 53, *l, o–r*) 6

From Rooms A, B, G, H, floors; Trench 1.
Lengths, 2.4, 3.2, 5.0, (fragments over 4.7 cm.).
Widths, 1.4, 1.7, 3.0, 3.2, 2.5, 2.1 cm.
Thicknesses, 0.4, 0.4, 0.9, 0.8, 1.0, 0.6 cm.
Materials: Fine-grained basalt, chalcedony.

CHIPPED CUTTING AND PIERCING TOOLS

Discussion

The vast majority of the chipped implements were simple flake tools ranging in size from the largest thick scrapers, 9 cm. long and 4 cm. thick, to the smallest flake knives, 1 cm. long and 0.3 cm. thick. These scrapers also range in workmanship from utilized flakes or flakes showing chipping from use along one edge to those which have been chipped on all their major surfaces. There are many more utilized flakes than there are tools such as drills, saws, and projectile points. A half-dozen saws were recovered and about the same number of drills.

The recovery of choppers from Higgins Flat Pueblo indicates the continuation of the "hand-ax" tradition into the end of the chronological sequence in the Reserve area. These choppers are rather crude, core-like implements fashioned from large pebbles. Unlike other specimens recovered from late sites and levels in the area, all of these are rough and makeshift in appearance. They lack either the polished hand grip of the Tularosa Cave specimens or the carefully chipped cutting edge of the Reserve Phase specimens.

Distribution

The majority of the flake knives and scrapers could not be distinguished from those of other areas and horizons. An exception to this is the serrate scraper, which has a distribution primarily limited to those cultures with Cochise antecedents, such as the Hohokam (Haury, 1950, p. 224), the Forestdale Branch of the Mogollon (Haury and Sayles, 1947, p. 72) and the Mogollon of the Reserve area (Martin and others, 1952, p. 167). For the most part they have an earlier distribution in the Mogollon area but were recovered from late levels of Cordova Cave.

Chipped saws are limited in their distribution primarily to the upper Gila. Hough (1914, p. 23) illustrates them from Tularosa River, Apache Creek, and Luna sites. They occurred in the later levels of Tularosa Cave (Martin and others, 1952, p. 182). They also have been recovered from Reserve Phase sites in the Leggett Canyon (Martin and Rinaldo, 1950b, p. 484) and from O Block Cave (Martin, Rinaldo and Bluhm, 1954). They occur mostly in late sites and levels (post A.D. 1000).

Classification of Saws

Thin flakes, irregular to rectangular in outline with one edge deeply indented, serrate; two specimens notched at one end (for hafting?) (fig. 54, *a–c, i–k*) 6

From Rooms A, C, Floor 1; Rooms A, F, fill.

Lengths, 4.6, 4.5, 3.5, 3.7, 2.3, 3.7 cm.

Widths, 2.6, 3.0, 3.9, 3.5, 1.9, 3.6 cm.

Thicknesses, 0.4, 1.0, 0.4, 0.5, 0.4, 0.6 cm.

Materials: Dark chalcedony, glassy rhyolite, chalcedony.

Classification of Drills

(a) Plain shafted type, long slender pointed flakes, biconvex in cross section with secondary chipping on both surfaces and edges; tapers gradually to the point (fig. 54, *f, g*) 2

From Room A, Floor 2; Trench 1, Level 1.

Lengths, 3.9, 3.5 cm.

Widths, 0.5, 1.0 cm.

Thicknesses, 0.4, 0.5 cm.

(b) Small abruptly widening flange with slender tapering point, one specimen resharpened (fig. 54, *d, e, h*) 3

From Rooms A, M, floors; Room A, fill.

Lengths, 5.0, 2.7 cm., (frag.).

Widths, 1.6, 1.8, 1.0 cm.

Thicknesses, 1.0, 0.6, 1.0 cm.

Materials: Flint, chalcedony.

Classification of Knives

Flake knives made from selected fortuitous flakes, generally chipped along one edge through use, more rarely sharpened by pressure retouch chipping, no regularity of outline (fig. 55) 75

From Rooms A, B, C, D, E, G, H, I, floors; Rooms A, B, C, D, E, F, G, fill; East Plaza, North Plaza.

Length, 1.1–5.4 cm.; average, 3.6 cm.

Width, 1.0–3.7 cm.; average, 2.2 cm.

Thickness, 0.3–0.9 cm.; average, 0.5 cm.

Materials: Chalcedony, fine-grained basalt, fine-grained rhyolite, green chalcedony, flint.

Classification of Scrapers

(a) Random, fortuitous, thick flakes, with poorly directed retouch (possibly from use) along one edge, generally plano-convex in cross section; convex surface shaped by percussion chipping; no regularity of outline (fig. 56, *a–g, i–l, n, o*) 78

From Rooms A, B, D, E, G, I, floors; Rooms A, C, D, E, F, fill; North Plaza, trenches.

Length, 2.4–6.7 cm.; average, 4.5 cm.

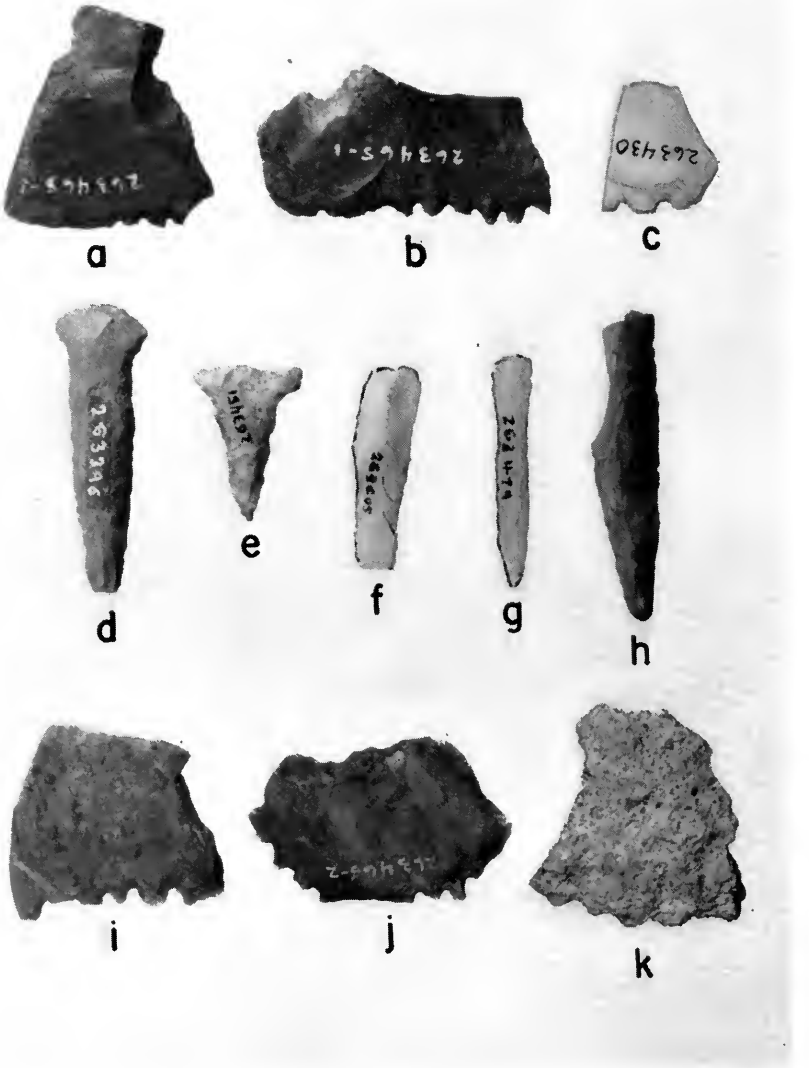


FIG. 54. Saws (*a–c*, *i–k*); drills (*d–h*). Length of *k*, 3.7 cm.

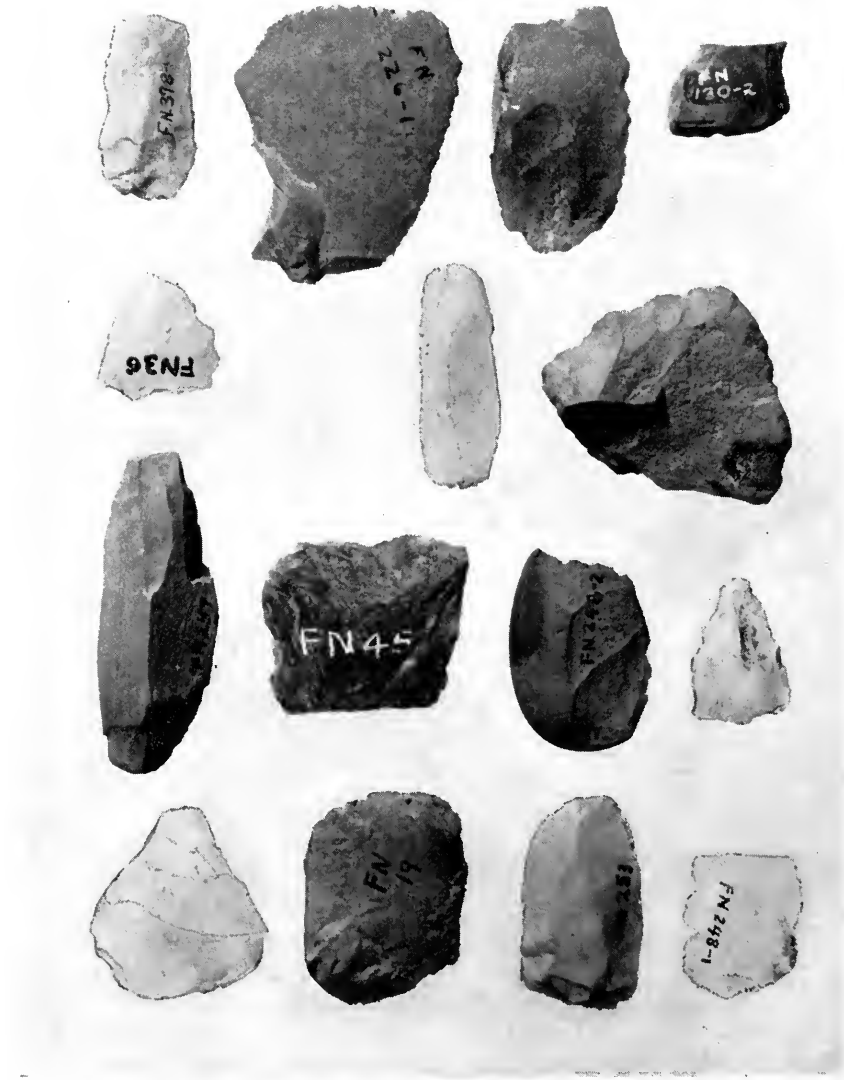


FIG. 55. Knives. Length of lower right specimen, 4.5 cm.

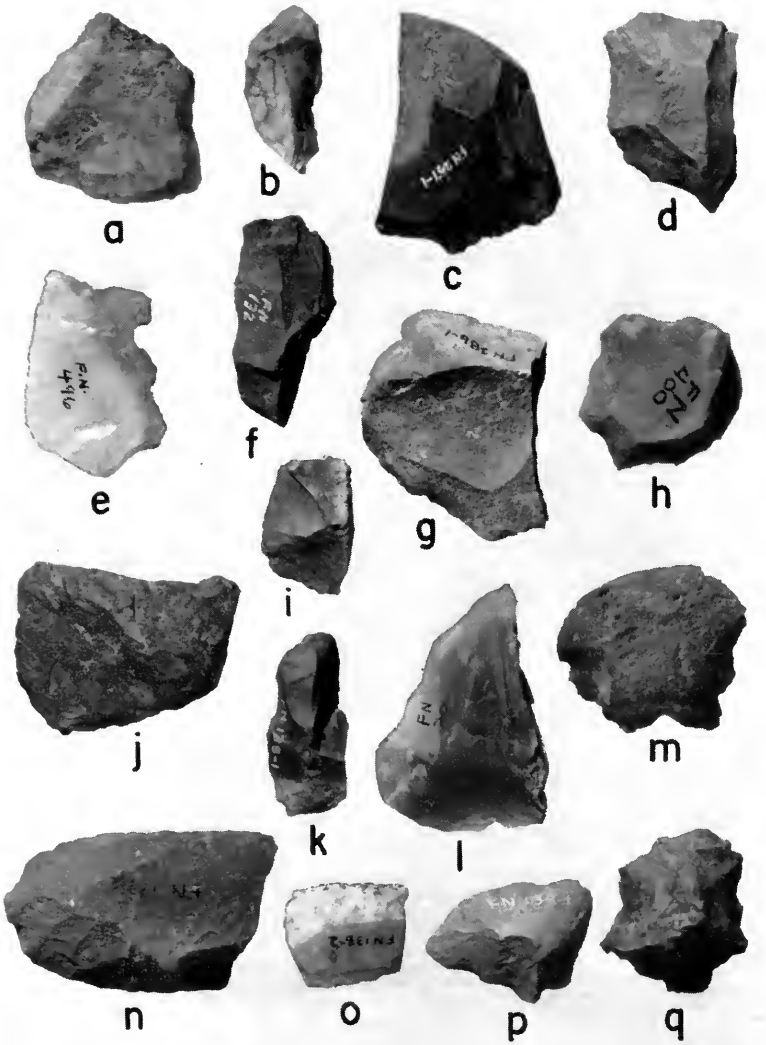


FIG. 56. Random flake scrapers (*a–g*, *i–l*, *n–o*); serrate scrapers (*h*, *m*, *p*, *q*). Length of *q*, 4.0 cm.

FIG. 57. Large rough thick scrapers. Length of lower right specimen, 7.7 cm.

Width, 1.1–6.1 cm.; average, 3.0 cm.
Thickness, 0.5–2.9 cm.; average, 1.2 cm.
Materials: Fine-grained basalt, rhyolite, jasper, flint.

(b) Large rough thick angular flakes with one edge sharpened by chipping (fig. 57) 6

From Rooms D, E, floor; Rooms A, B, D, fill.
Lengths, 6.7, 7.7, 6.8, 7.3, 7.7, 9.1 cm.
Widths, 6.6, 5.8, 7.1, 6.1, 6.1, 5.4 cm.
Thicknesses, 4.0, 3.4, 3.1, 4.5, 2.1, 1.1 cm.
Materials: Fine-grained basalt, rhyolite.

(c) Thick nodules, generally circular in outline, plano-convex in cross section with sides steeply chipped into deep notches forming a large-toothed serrate edge (fig. 56, *h*, *m*, *p*, *q*) 4

From Rooms B, E, floors; Rooms B, G, fill.
Lengths, 4.7, 4.2, 4.6, 4.1 cm.
Widths, 4.2, 2.8, 3.5, 3.9 cm.
Thicknesses, 1.7, 1.2, 1.6, 1.1 cm.
Materials: Rhyolite, jasper, dark chalcedony.

Classification of Choppers

(a) Thick angular core implements, percussion flaked on part of margin to form sharp cutting edge; generally part of original surface of pebble left intact to form a smooth surface for grip; margin chipped from one surface only (fig. 58, *a–c*, *f*) 4

From Rooms B, D, floors; Rooms D, E, fill.
Lengths, 6.2, 9.0, 11.4, 11.2 cm.
Widths, 5.8, 7.5, 7.8, 8.7 cm.
Thicknesses, 3.0, 4.2, 3.2, 3.8 cm.
Materials: Rhyolite, jasper.

(b) Biface type, same as above except margin chipped from both surfaces (fig. 58, *d*, *e*) 7

From Rooms B, D, floors; Rooms A, C, fill; Trench II.
Lengths, 7.3, 11.0, 9.4, 7.5, 8.6, 9.8, 8.3 cm.
Widths, 7.2, 9.1, 6.1, 4.6, 6.8, 8.9, 6.4 cm.
Thicknesses, 3.8, 4.5, 5.3, 3.9, 5.5, 6.9, 3.5 cm.
Materials: Rhyolite, jasper, flint.

SHELL ORNAMENTS

Discussion

A larger number of shell artifacts were recovered from Higgins Flat Pueblo than from any site previously excavated in the Reserve area. This suggests an expansion of trade between the Reserve area and the Gulf of California during the Tularosa Phase. All of the shells that could be identified were native to the Gulf of Cali-

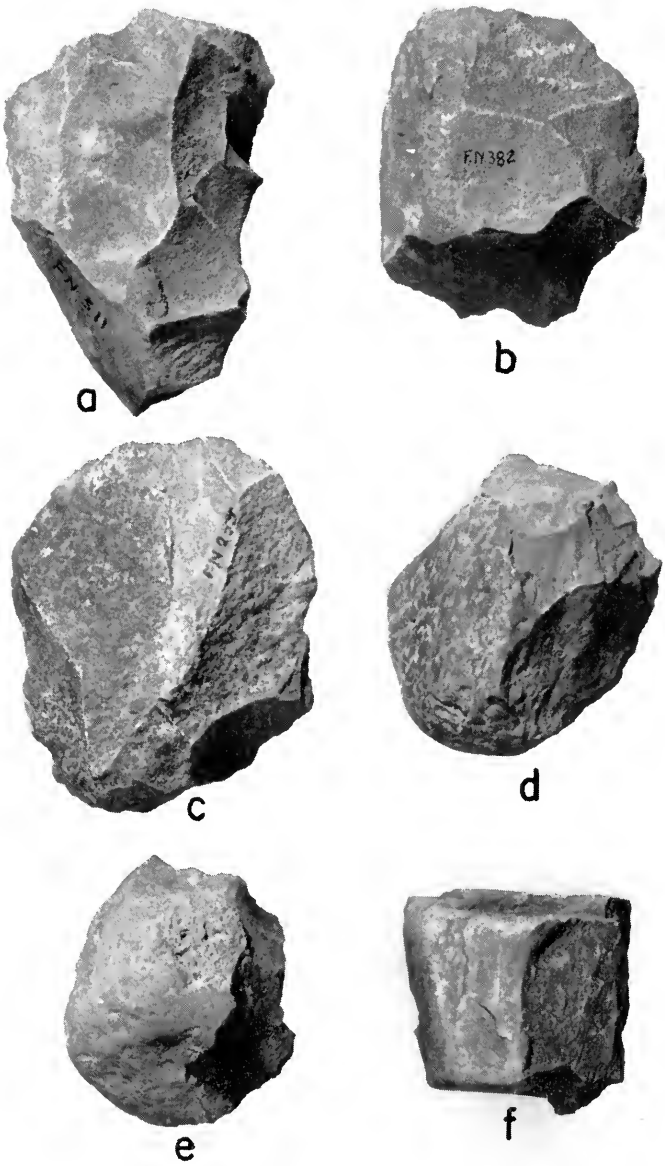


FIG. 58. Choppers. Length of *f*, 6.2 cm.

fornia rather than the Pacific coast. This seems reasonable, inasmuch as the upper Gila is closer to the Gulf of California than to the Pacific Ocean (Tower, 1945, p. 19).

Beads of tinkler and disc types, made of *Oliva* and *Conus* shells, were found with two burials. In both instances their position indicated use as necklaces. One of these burials also was adorned with a shell bracelet. In addition, two whole shell pendants of almost identical shape were found on Floor 3 of Room A. Floor 3 was a rather small area and it seems probable that these two pendants once formed a pair—possibly they were ear bobs. The position of the remainder of the shell artifacts, most of which are fragments of shell bracelets, was such as to give no hint as to their specific use.

The recovery of one unworked whole shell indicates that some of the ornament manufacture may have been done locally rather than at the point of origin of the raw material. However, it should be noted that this is a small shell; ornaments of large shells such as bracelets were probably manufactured on the coast of the Gulf of California (Tower, 1945, p. 37).

Distribution

The abundance and variety of raw shell and shell artifacts in the southern part of the Southwest, among the Hohokam and the Mimbres, and their decrease as one moves north has been noted by Tower (1945, pp. 18, 19), who also noted the increase in the quantity of shell traded in the later periods in Southwestern prehistory. The artifacts from Higgins Flat Pueblo corroborate this trend. The shell artifacts from Higgins Flat Pueblo are not as numerous as they are on sites farther south, such as the Swarts Ruin (Cosgrove, 1932, pp. 65–66), yet they are more abundant than they are from the earlier sites in the Reserve area.

Some of the types of shell artifacts are also characteristic chiefly of the later phases. Among these are double lobe beads. The earliest occurrence of double lobe beads among the Mogollon is during the Three Circle Phase (Haury, 1936a, p. 78 and fig. 30). Nesbitt also recovered them at the Starkweather Ruin and indicated that they are a late Pueblo development (Nesbitt, 1931, p. 110). They were recovered at Snaketown, a Hohokam site, in Santa Cruz Phase associations (Gladwin and others, 1937, p. 140), but these were an earlier smaller variant. The larger late variant occurred in the Sacaton Phase. They are reported as early as

Developmental Pueblo on Anasazi sites (Roberts, 1940, p. 131) but are also reported from such Great Pueblo sites as Aztec (Morris, 1919, p. 95) and Pueblo Bonito (Pepper, 1920, p. 83).

Another type of ornament, generally indicative of a late horizon, is the tinkler bead made of *Conus* shell. These were common at Los Muertos (Haury, 1945a, p. 149) and at Pecos (Kidder, 1932, pp. 190–192). They also were recovered at the Swarts Ruin (Cosgrove, 1932, p. 65) and at Starkweather Ruin (Nesbitt, 1938, p. 110). Cut and carved shell pendants of zoomorphic form (fig. 59, *g*, *h*) have a similar distribution in time and space. The carved shell frog effigy appears to be particularly characteristic of late Hohokam sites, having been recovered at Los Muertos (Haury, 1945a, p. 152), Las Acequias (Tower, 1945, p. 55) and Snaketown (Gladwin and others, 1937, p. 142).

The occurrence of fragmentary large thick shell bracelets at Higgins Flat Pueblo may also be indicative of the position of this pueblo in the Tularosa Phase. This thick type occurs characteristically late in the Gila-Salt area (Haury, *in* Gladwin and others, 1937, p. 142) and a similar chronological distribution was indicated farther north at Starkweather Ruin (Nesbitt, 1938, p. 108).

Classification of Pendants

(a) Whole shell type, half of bivalve perforated near umbo, one with wings of umbo cut off (fig. 59, *i*, *j*, *k*) 3

From Room A, Floor 3.
Lengths, 5.3, 4.3, 3.8 cm.
Widths, 5.0, 3.1, 3.7 cm.
Thicknesses, 0.1, 0.2, 0.2 cm.
Material: *Pecten circularis* Sowerby.

(b) Carved zoomorphic effigy type, umbo of bivalve carved and incised with lines to represent life form, possibly frog (fig. 59, *h*) 1

From Room N, Floor 1.
Length, 2.5 cm.
Width, 1.9 cm.
Thickness, 1.1 cm.
Material: *Arca* sp.?

(c) Curved, tusk-like section of bivalve shell, sharp at one end; numerous incised lines encircle pointed end; eye missing (fig. 59, *c*) 1

From Room A, Floor 1.
Length, 3.7 cm.
Width, 0.5 cm.
Thickness, 0.3 cm.
Material: Most likely *Glycymeris* (*Glycymeris*) *maculata* Broderip.

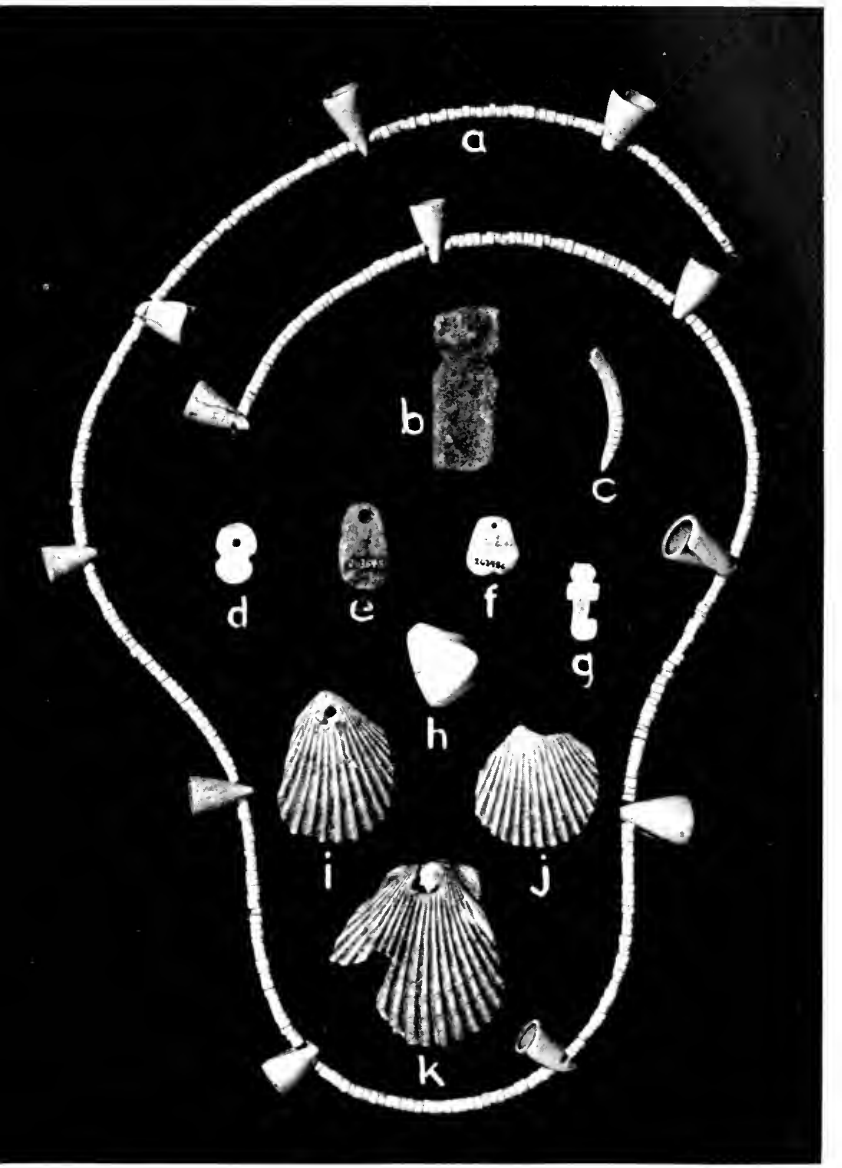


FIG. 59. Stone and shell ornaments. Length of *k*, 5.3 cm.

Classification of Beads

(a) Small disc type in necklace of 433 beads with 12 *Conus* tinkler shells (fig. 59, *a*) 434

From Room E, Floor 2 (necklace); Floor 3 (single disc bead).

Diameter, 0.3–0.5 cm.

Thickness, 0.2–0.25 cm.

Material: *Dentalium* sp.?

(b) *Conus* tinkler type, hollow cone shape with semi-lunar shaped sawed slot near one end for stringing (fig. 59, *a*) 13

From Room E, Floor 2, necklace on Burial E-1; Room D, fill.

Height, 1.6–2.1 cm.

Diameter, 1.2–1.6 cm.

Material: *Conus gladiator* Broderip.

(c) *Olivella* type; small shells with spire ground off for stringing 13

From Room A, Floor 2, Burial 7.

Length, 0.4–0.7 cm.

Diameter, 0.3–0.5 cm.

Material: *Olivella* sp.

(d) Double-lobed type; figure eight shape in outline, drilled at one end for suspension (fig. 59, *d*) 1

From Room J, Floor 1.

Length, 1.8 cm.

Width, 1.2 cm.

Thickness, 0.4 cm.

Material: Unknown shell.

Classification of Bracelets

(a) Thin curved sections of bivalve shell, rectangular or triangular in cross section, almost as wide as high (nine rectangular in cross section, four triangular to oval in cross section) (fig. 60, *a*, *b*, *d*) . . . 13

From Rooms A, B, C, E, G, M, floors; Rooms B, D, fill.

Diameter of whole specimen, 5.5 cm.

Length of fragments, 2.1–5.3 cm.; height, 0.4–0.7 cm.; width, 0.2–0.6 cm.

Three specimens notched, the remainder smooth; three specimens with perforated umbo.

Material: *Glycymeris* (*Glycymeris*) *maculata* Broderip.

(b) Thick curved section of bivalve shell, triangular in cross section, higher than wide (fig. 60, *c*) 4

From Rooms A, B, I, floors; Room A, fill.

One specimen notched; another specimen incised around umbo.

All fragments: Lengths, 4.2, 7.6, 4.5, 8.0 cm.; heights, 0.9, 1.0, 1.0, 0.8 cm.; widths, 0.6, 0.7, 0.3, 0.5 cm.

Material: *Glycymeris* (*Glycymeris*) *maculata* Broderip.

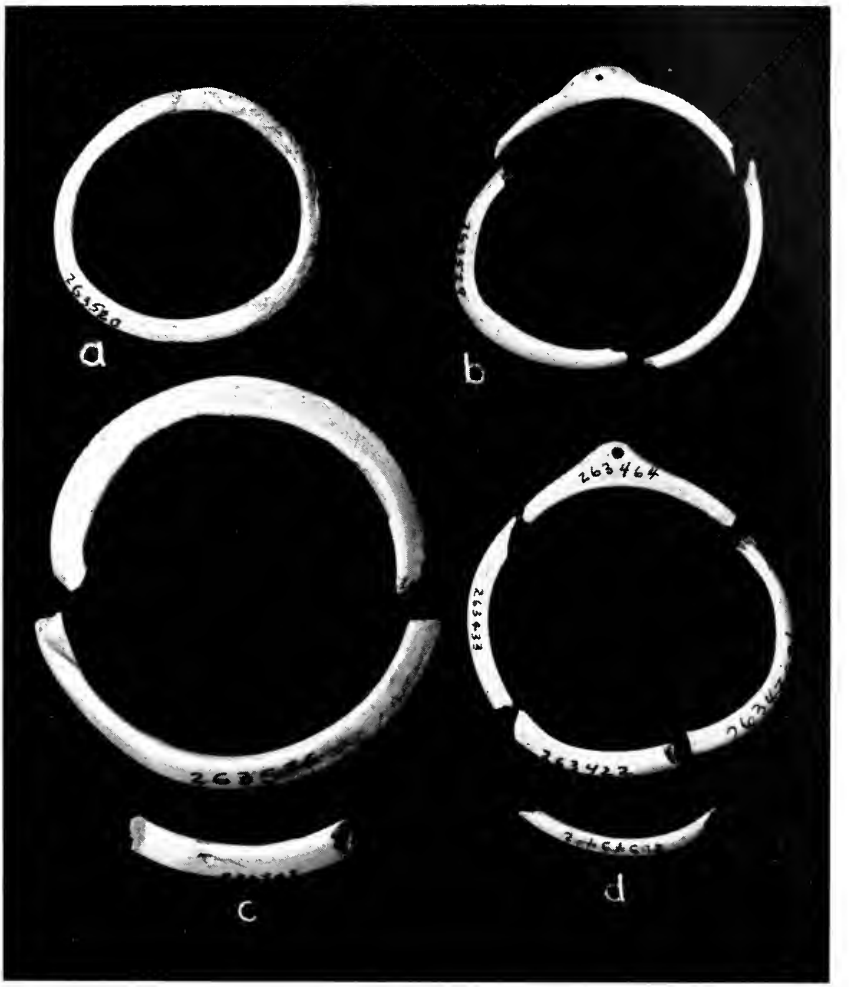


FIG. 60. Shell bracelets. Diameter of *a*, 5.5 cm.

BONE WEAVING TOOLS

Discussion

Most of the fifty-seven bone awls found in Higgins Flat Pueblo were made of split bone. Scarcely a dozen were not split, but this dozen represents a greater frequency of this type at Higgins Flat Pueblo than at the earlier sites in the Reserve area. Awls were one of the most numerous artifacts found at this site and together with

the remains of fabrics suggests that the inhabitants of this particular pueblo had a special interest in weaving.

A unique weaving tool is a combination awl and wrench. The use of awls in weaving for the Reserve area was indicated by the association of awls with basketry materials in Tularosa Cave (Martin and others, 1952, p. 107). This use is also indicated by historic analogy (Hough, 1914, p. 278; and Chicago Natural History Museum specimens cat. nos. 44540, 44543). The point of the tool from Higgins Flat Pueblo does not show use as a flaker and the shaft is flat. It therefore presented a problem, because wrenches have ordinarily been described in the literature as tools for straightening arrow shafts (Hough, 1914, p. 288). The solution to this problem lay in the museum collections, wherein similar specimens are catalogued as spindle straighteners (cat. no. 44756). To describe this tool as a weaving tool and spindle straightener wrench fits it more accurately than to term it a flaker and arrow shaft straightener wrench.

Three awls are notched, two have the beginning of a perforation through what is left of the head of the bone, and two tips are classed as flakers because they have beveled, blunt, and scarred ends. Another tip is so flat, thin, and blunt that it resembles more closely the needle or bodkin from Turkey Foot Ridge Village (Martin and Rinaldo, 1950a, p. 348) than it does the other awls, even those with flat tips. It has therefore been classed as a bodkin tip in spite of the fact that the end containing the eye is missing.

Distribution

There is nothing particularly significant about the distribution of the bone awls within the pueblo. They were found in all the rooms except the two smallest, F and K, and they occurred in a random distribution on all floor levels and in the fill of the rooms and plazas. Furthermore, there was no preponderance of any type within a particular room or level.

When they are compared with the awls from other sites in the Reserve area such as the SU Site, Turkey Foot Ridge Village, or Wet Leggett Pueblo it is evident that there are many more awls from Higgins Flat Pueblo, and that there are more awls with the head of the bone intact than from the earlier sites.

Classification of Bone Weaving Tools

(a) Head of bone intact, other end ground and polished to a point (fig. 61, *a–f*) 14

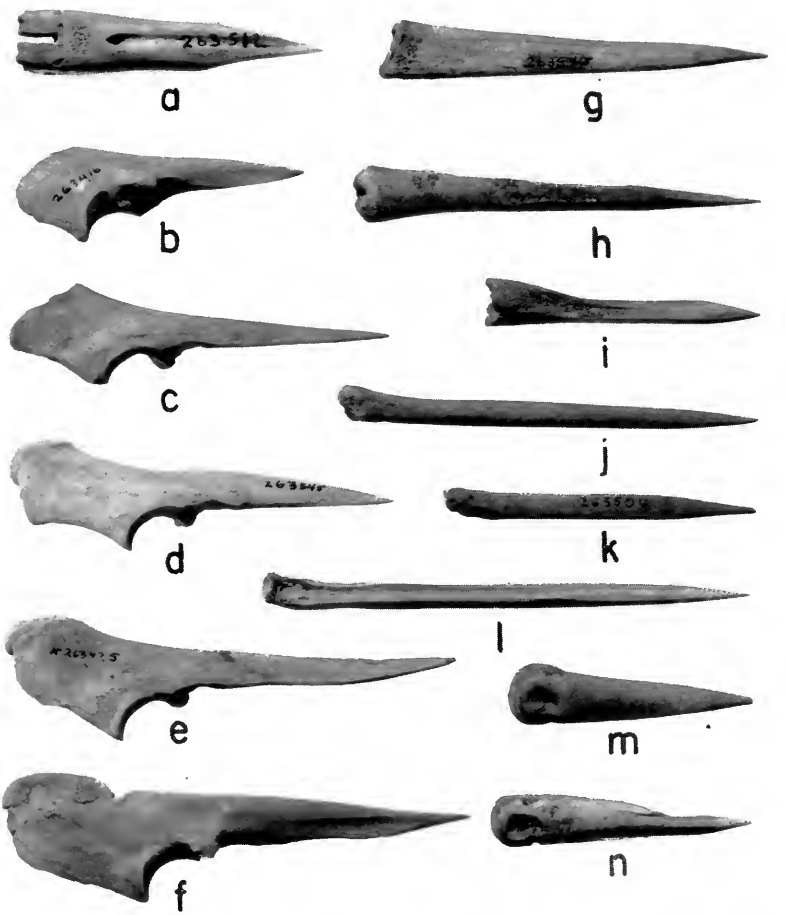


FIG. 61. Bone awls, miscellaneous types. Length of *g*, 12.9 cm.

From Rooms A, B, E, F, J, M, floors; Rooms A, D, J, L, fill.
Length, 7.9–18.4 cm.; average, 11.9 cm.
Material: Deer (*Odocoileus*) ulnas and metacarpal.

(b) Head of bone unworked except by original splitting; other end ground and polished to a sharp point; made from long bones split in half; three specimens with side notch; four specimens made from long bones split in quarters (fig. 61, *g–n*) 19

From Rooms A, C, E, F, H, L, floors; Rooms A, E, L, fill.

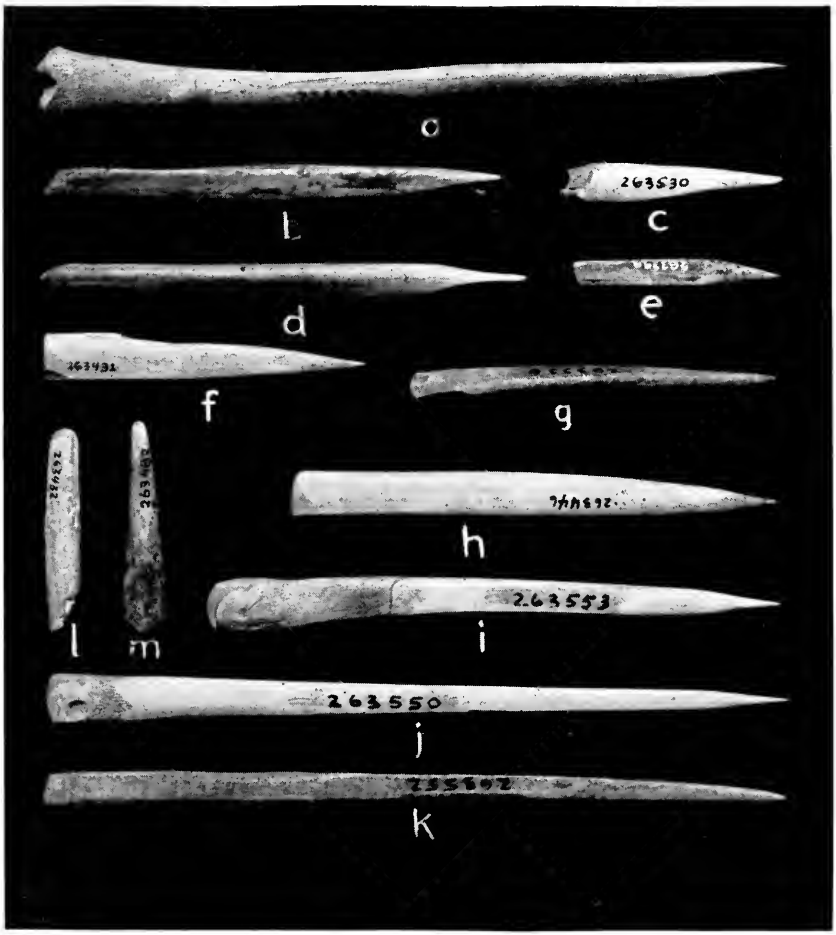


FIG. 62. Bone awls and flakers. Length of *c*, 6.2 cm.

Length, 6.7–17.8 cm.; average, 13.3 cm.
Material: Deer (*Odocoileus*) metacarpals.

(c) Head of bone partly worked down, almost removed, other end ground and polished to a point; made from long bones split in half; two specimens with beginning of perforation through head of bone (fig. 62, *i–k*) 3

From Room L, fill; North Plaza outside Room F.
Lengths, 21.6, 16.6, 21.4 cm.
Material: Deer (*Odocoileus*) metacarpals.

(d) Head of bone removed, cut off squarely, other end ground and polished to a sharp point (fig. 62, *g*, *h*) 4

From Rooms A, I, floors; Room B, fill.
Lengths, 10.6, 10.0, 14.1, 9.3 cm.

(e) Awl and wrench combination; one end perforated with three holes 0.8, 1.1 cm. diameter; the other end thin, flat, pointed, made from section of antler (fig. 63, *e*) 2

From Rooms M, B, floors.
Lengths, 19.9 cm., fragment 17.6 cm.

(f) Hollowed out shaft, polished, one end notched, other end ground and polished to point, carefully finished (fig. 63, *j*) 1

From Room C, below floor.
Length, 24.2 cm.

(g) Splinters of long bone with one end ground and polished to a point; one specimen with shouldered tip (fig. 62, *b*, *d*) 4

From Rooms F, M, floors; Room D, fill; Trench II.
Lengths, 13.3, 14.1, 7.2, 4.7 cm.

(h) Points, tips and fragments of awls, mostly from long bones split in half 14

From Rooms A, B, C, D, E, G, H, I, floors; Rooms A, B, C, fill.
All fragments, 3.1–10.0 cm. long.

(i) Thin, flat, blunt tip, possibly bodkin (fig. 63, *a*) 1

From Room B, fill.
Length, (frag.) 8.0 cm.; width, 1.2 cm.; thickness, 0.3 cm.

(j) Fragments with beveled, blunt and scarred ends (fig. 62, *l*, *m*) 2

From Room A, Floor 1; Room C below floor.
Length, 6.2, 6.0 cm.

BONE CHISELS

(Figure 63, *f*, *h*)

Discussion

Two objects made of large heavy long bones, one end of which had been cut at an oblique angle to form a beveled edge, were recovered from below the floor of Room C. On one fragmentary specimen the working end had been brought to an edge by grinding from one side only. Both tools had been hollowed out by removing most of the inner cancellous portion of the bone so that a channel runs the length of the specimen. The surfaces around the beveled end are scored deeply. These implements are made of heavier, thicker bones than ordinary fleshers, although they could have been used as fleshers rather than chisels. The fragmentary specimen is also different from the common prehistoric Pueblo flesher in that its end was brought to a bevel from both surfaces rather than

from one surface. Similar objects classed as chisels were found at Hawikuh (Hodge, 1920, p. 110). The complete specimen is 13.5 cm. long and the fragmentary specimen is 11.5 cm. long.

BONE RING

(Figure 63, *b*)

A small bone ring made from a thin section of a large limb bone was recovered from Room B, fill. It is the size of a large finger ring (outside diameter 2.3 cm., thickness 0.3 cm.). Similar specimens have been recovered from pueblos such as Canyon Creek (Haury, 1934, p. 126), Kinishba (Baldwin, 1939, p. 321), Hawikuh (Hodge, 1920, p. 145), Kiatuthlanna (Roberts, 1931, p. 153) and Tseh Tso (Hibben, *in* Brand and others, 1937).

ANTLER TOOLS

Discussion

Only four antler tools were recovered, in addition to the bone awl-wrenches described above. Two of these were classified as flakers because they show only general wear at the tip. Another has a wedge-shaped point with tiny facets on opposite sides of the tip, apparently made by grinding; this has been classified as a wedge for splitting wood. The fourth tool is clearly a wrench made from nearly the whole antler, with the wrench holes drilled through the fork.

Distribution

On the basis of present information, the distribution of wrenches centers in sites of Pueblo III age or later. They are not uncommon in east central Arizona and west central New Mexico, having been recovered from such sites as Canyon Creek, Kinishba, and Point of Pines (Haury, 1934, p. 126; Baldwin, 1939, pp. 319–320; Wendorf, 1950, p. 83). Wrenches of materials other than deer antler have been recovered from other areas, although in similar horizons for the most part; for example, wrenches from the San Juan district are of mountain sheep horn (Kidder and Guernsey, 1919, p. 129) and those from the Rio Grande are frequently of bone (Kidder, 1932, pp. 240–241). Antler wedges have a similar distribution.

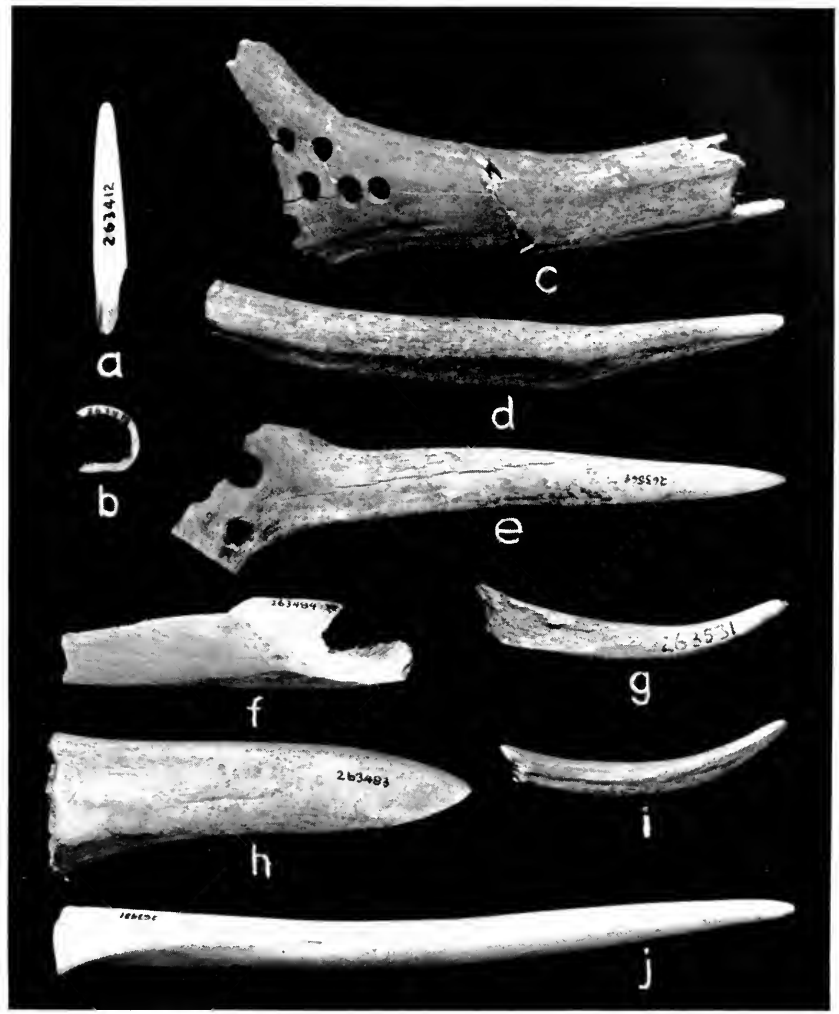


FIG. 63. Awls (*e*, *j*); antler tools (*c*, *d*, *g*, *i*); bodkin (*a*); ring (*b*); chisels (*f*, *h*). Length of *j*, 24.2 cm.

Classification of Antler Flakers

Antler tines showing general wear at the tip (fig. 63, *g*, *i*) 2
From Room G, Floor 3; Room J, fill.
Lengths, 10.4, 9.4 cm.
Material: Deer (*Odocoileus*) antler.

Classification of Antler Wedge

Antler tine with wedge-shaped tip, with tiny facets on opposite sides of tip made by grinding (fig. 63, *d*) 2

From Rooms E, F, floors.
Lengths, 18.9, 12.3 cm.
Widths, 2.2, 2.7 cm.
Thicknesses, 1.7, 1.8 cm.

Classification of Antler Wrench

Whole antler with eight holes drilled through fork, tip of one branch beveled as if used for flaker (fig. 63, *c*) 1

From Room J, Floor 1.
Length, (frag.) 31.5 cm.; diameter of holes, 0.8–0.9 cm.
Material: Deer (*Odocoileus*) antler.

CLAY ARTIFACTS

Discussion

Worked sherds are one of the most widespread of Southwestern artifacts. Generally they appear in a number of shapes such as disc, triangular, keystone, and oval. Partly because most of the Higgins Flat specimens were fragmentary they have been classified into only two types, perforated discs or spindle whorls, and oblongs or rounded rectangles. Most of the perforated disc sherds were drilled from both surfaces, although three specimens were drilled from one surface. As a consequence, most of the holes are roughly hourglass-shaped in section. Only one sherd of the spindle whorl type is made of a painted decorated type; this one, strangely enough, is made of Three Circle Red-on-White instead of one of the more frequent types such as Reserve Black-on-White. The other worked sherds are of Reserve Smudged or San Francisco Red. Very few worked sherds are made of Alma Plain. This may be because Alma Plain occurred on this site in relatively smaller frequency (from 4 to 40 per cent as compared with 40 to 60 per cent on Reserve Phase sites). On early sites, particularly at the SU Site, Alma Plain worked sherds were much more frequent (Martin, 1943, p. 230). Throughout the sequence in the Reserve area worked sherds were never made from textured pottery types such as Plain Corrugated or Reserve Indented Corrugated. Rough sherds were possibly not suitable for the uses to which worked sherds were put, whether as spindle whorls, scoops, spoons, or game counters.

Clay animal effigies appear to be one of the characteristic traits of the pueblos of the Reserve area and probably of neighboring

areas such as the Point of Pines. The majority of them are fragmentary, with legs, head, and tail missing. One head was recovered with only the fore part of the body, and the most complete specimen from Higgins Flat Pueblo has only one leg, although it has a head and a tail.

Distribution

Similar animal effigies have been reported from several pueblos in the Reserve area, including Oak Springs Pueblo (Martin, Rinaldo, and Antevs, 1949, p. 178), Three Pines Pueblo (Martin and Rinaldo, 1950b, p. 494), Spur Ranch Ruin (Hough, 1914, pp. 115–116), Tularosa Cave (Martin and others, 1952, p. 194), Hinkle Park Cliff-Dwelling (Martin, Rinaldo and Bluhm, 1954), and Starkweather Ruin (Nesbitt, 1938, p. 100). They have apparently a less frequent occurrence to the south, although they have been reported from the Mattocks Ruin, the Babocomari Site, Los Muertos, and Snaketown (Nesbitt, 1931, p. 87; Di Peso, 1951, p. 108; Haury, 1945a, p. 115; Gladwin and others, 1937, p. 238).

Classification of Worked Sherds

(a) Perforated disc-shaped sherds, edges ground smooth 10

From Rooms B, D, I, floors; Rooms A, E, fill.

Diameters, 3.4–5.3 cm.; average, 4.3 cm.

Thicknesses, 0.3–0.8 cm.; average, 0.5 cm.

Materials: Reserve Smudged, Alma Plain, San Francisco Red, Three Circle Red-on-White.

(b) Roughly rectangular in outline with some curved edges; edges ground smooth 17

From Rooms A, B, D, E, I, J, floors; trenches, Room C below floor.

Lengths, 2.8–7.6 cm.; average, 4.4 cm.

Widths, 1.5–6.3 cm.; average, 3.5 cm.

Thicknesses, 0.3–0.7 cm.; average, 0.5 cm.

Materials: Reserve Smudged, Alma Plain, San Francisco Red, Reserve Black-on-White, Tularosa Black-on-White, Wingate Black-on-Red.

Classification of Animal Effigies

Quadruped animal figures, portions of heads, legs, and tails broken off; three specimens perforated longitudinally from just below neck to just below tail (fig. 65) 6

From Rooms B, D, I, Floor 1; Trenches I and II.

Lengths, 6.1, 4.8, 5.0, 5.1, 4.7, 5.3 cm.

Widths, 3.1, 4.1, 2.5, 3.2, 3.3, 1.6 cm.

Heights, 3.6, 2.6, 1.7, 3.4, 3.2, 2.2 cm.

FIG. 64. Worked sherds, miscellaneous types. Length of lower right specimen, 6.8 cm.

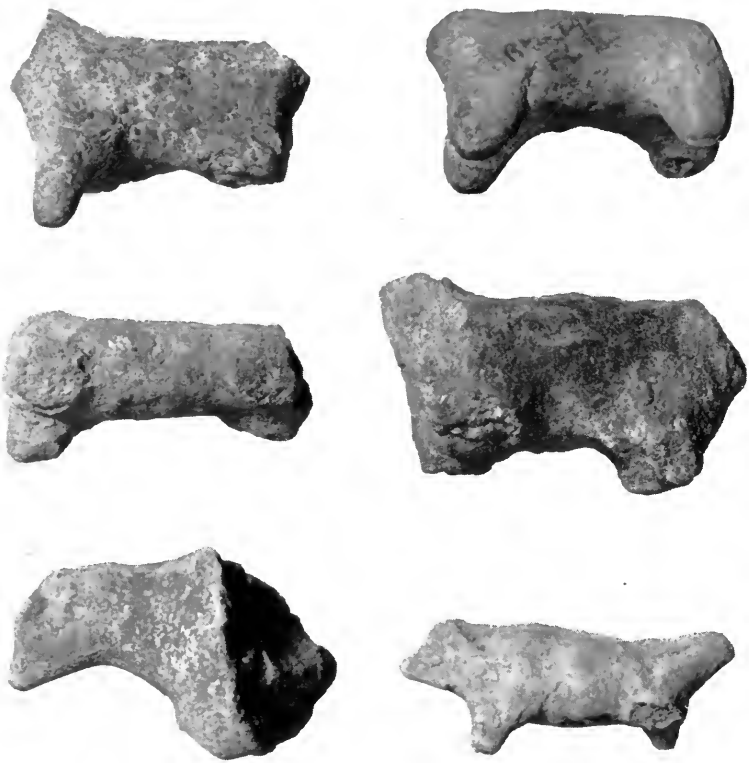


FIG. 65. Baked clay effigies of animals. Length of lower right specimen, 4.7 cm.

UNWORKED STONE

Classification of Pigments

Green lumps of pigment (malachite), three specimens faceted..... 12
From Rooms A, B, D, J, L, floors; North Plaza.

Red lump of pigment (hematite) faceted, 6; raw lump, 1..... 7
From Room L, Floor 2; Room C, below floor; Room A, fill, Floor 1.

Classification of Crystals

Sharp hexagonal quartz crystals, possibly drills..... 2
From Room A, Floor 3.

Cylindrical stalactite crystal 1
From Room E, Floor 3.
Length, 5.4 cm.
Diameter, 1.1 cm.

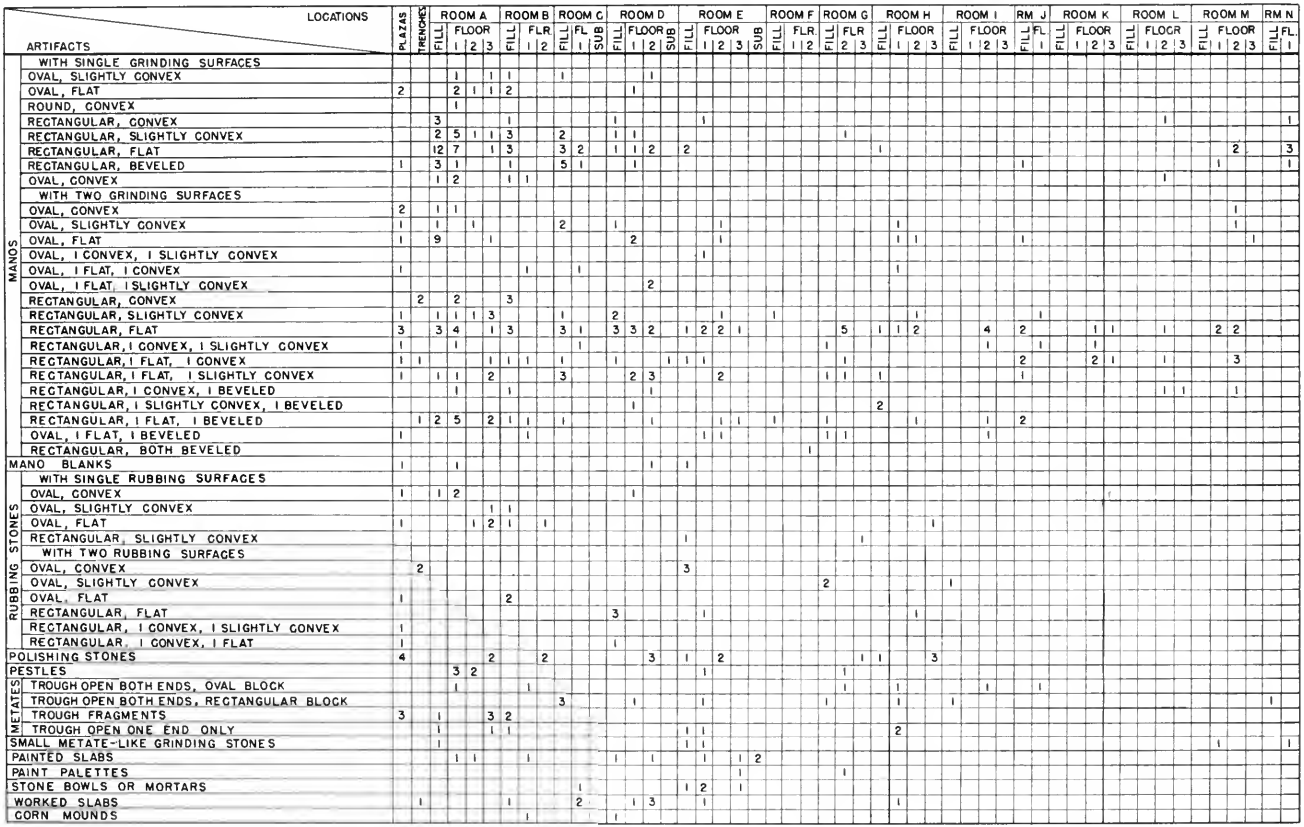
Mushroom-shaped erosion remnant 1
From Room H, floor.
Height, 9.8 cm.
Width, 8.2 cm.
Thickness, 6.1 cm.

SUMMARY

The artifacts from Higgins Flat Pueblo seem significant for what they contribute to a definition of the Tularosa Phase as manifested on the upper Gila drainage, and to our knowledge of its distribution and extent. The following types of artifacts appear to be characteristic of this phase: stone animal effigies, clay animal effigies, chipped stone saws, painted slabs, painted bowls, shouldered tubular pipes, antler wrenches, beveled manos, through trough metates, arrow shaft straighteners, cut and carved shell ornaments, thick shell bracelets, simple incised paint palettes, lapstones and corn mounds, three quarters and full grooved axes, and smooth stone saws or fleshing knives. Some of these artifact types, such as chipped stone saws, appear to have their center of distribution along the upper San Francisco River, not far from Reserve, New Mexico. Others, such as the cut and carved shell ornaments, including double-lobed beads, *Conus* shell tinkler beads, frog effigy pendants, and thick shell bracelets, as well as three quarters grooved axes and paint palettes, are objects which are relatively scarce here on the upper San Francisco River and were probably traded in from the Hohokam, because they are plentiful on Classic Hohokam sites such as Los Muertos and Las Acequias. A very few culture elements, such as corn mounds and lapstones, are more likely importations from the Anasazi either by trade or by stimulus diffusion.

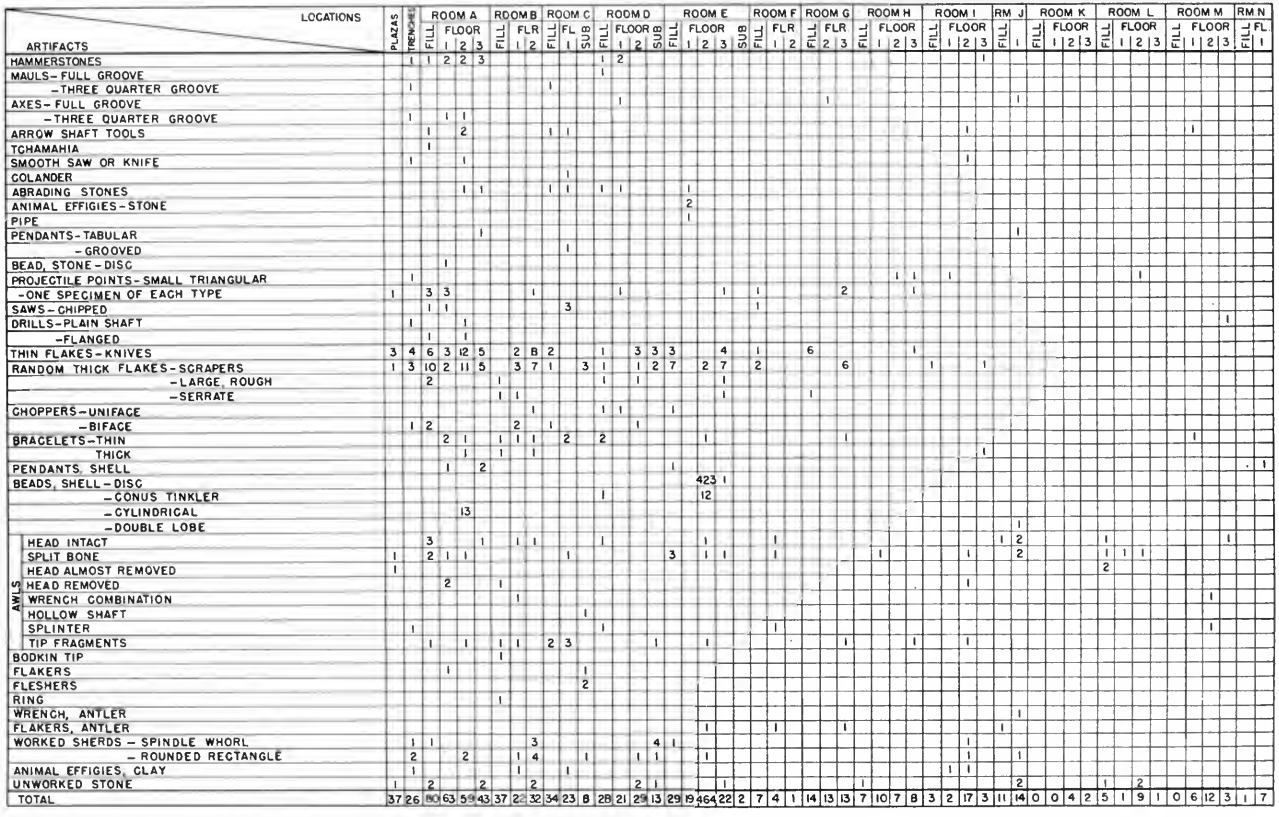
The distribution of most of these traits is not exclusively in the upper Gila drainage. Some of these types, such as stone animal effigies, painted slabs, and painted bowls (fig. 66), have a distribution in late sites of the Mimbres area, and at sites such as W:10:51 at Point of Pines, Pinedale, Showlow, and Kinishba in the White Mountains. Individually, some of these traits, such as painted slabs, for instance, have a distribution beyond these areas, to the north and west. Nevertheless, their distribution as a related group

FIG. 66. Facsimiles of ceremonial objects found in group on Floor 1, Room E, showing restored painted patterns. Length of pipe, 17.8 cm.



ARTIFACTS \ LOCATIONS			PLAZAS	TRENCHES	ROOM A				ROOM B		ROOM C			ROOM D			ROOM E				ROOM F		ROOM G		ROOM H			ROOM I			RM J		ROOM K			ROOM L			ROOM M			RM N	
					FILL	FLOOR			FILL	FLR	FILL	FL		FILL	FLOOR		FILL	FLOOR			FILL	FLR	FILL	FLR	FILL	FLOOR			FLOOR			FILL	FL	FILL	FLOOR			FLOOR		FILL	FL		FILL	FL
						1	2	3		1 2			SUB		1	2	SUB		1	2	3	SUB		1 2		2	3		1	2	3				1	2	3		1	2	3		1	2	3			
MANOS	WITH SINGLE GRINDING SURFACES																																										
	OVAL, SLIGHTLY CONVEX				1			1	1		1				1																												
	OVAL, FLAT		2		2	1	1	2						1																													
	ROUND, CONVEX				1																																						
	RECTANGULAR, CONVEX				3				1					1				1																									1	
	RECTANGULAR, SLIGHTLY CONVEX				2	5	1	1	3		2			1	1									1																			
	RECTANGULAR, FLAT				12	7		1	3		3	2		1	1	2	2								1														2		3	
	RECTANGULAR, BEVELED		1		3	1			1		5	1		1															1									1			1	
	OVAL, CONVEX				1	2			1	1																																
	WITH TWO GRINDING SURFACES																																										
	OVAL, CONVEX		2		1	1																																		1		
	OVAL, SLIGHTLY CONVEX		1		1		1				2			1				1						1																1		
	OVAL, FLAT		1		9			1						2				1						1	1				1										1		
	OVAL, 1 CONVEX, 1 SLIGHTLY CONVEX																	1																								
	OVAL, 1 FLAT, 1 CONVEX		1							1		1													1																	
	OVAL, 1 FLAT, 1 SLIGHTLY CONVEX														2																											
	RECTANGULAR, CONVEX			2		2			3																																		
	RECTANGULAR, SLIGHTLY CONVEX		1		1	1	1	3			1			2				1				1				1				1												
	RECTANGULAR, FLAT		3		3	4		1	3		3	1		3	3	2	1	2	2	1					5		1	1	2		4		2			1	1		1		2	2	
	RECTANGULAR, 1 CONVEX, 1 SLIGHTLY CONVEX		1			1						1										1						1			1				1						
	RECTANGULAR, 1 FLAT, 1 CONVEX		1	1				1	1	1	1			1			1	1							1							2			2	1		1		3		
	RECTANGULAR, 1 FLAT, 1 SLIGHTLY CONVEX		1		1	1		2			3			2	3			2				1	1		1				1													
	RECTANGULAR, 1 CONVEX, 1 BEVELED					1			1						1																								1	1		1		
	RECTANGULAR, 1 SLIGHTLY CONVEX, 1 BEVELED													1												2																
	RECTANGULAR, 1 FLAT, 1 BEVELED			1	2	5		2	1	1	1				1			1	1		1		1				1			1		2									
	OVAL, 1 FLAT, 1 BEVELED		1							1								1	1				1	1					1													
	RECTANGULAR, BOTH BEVELED																					1																				
MANO BLANKS			1			1									1		1																										
RUBBING STONES	WITH SINGLE RUBBING SURFACES																																										
	OVAL, CONVEX		1		1	2								1																												
	OVAL, SLIGHTLY CONVEX						1	1																																		
	OVAL, FLAT		1			1	2	1		1															1																	
	RECTANGULAR, SLIGHTLY CONVEX																	1						1																		
	WITH TWO RUBBING SURFACES																																										
	OVAL, CONVEX			2														3																									
	OVAL, SLIGHTLY CONVEX																						2			1																
	OVAL, FLAT		1					2																																		
	RECTANGULAR, FLAT													3				1								1																
	RECTANGULAR, 1 CONVEX, 1 SLIGHTLY CONVEX		1																																						
	RECTANGULAR, 1 CONVEX, 1 FLAT		1											1																											
POLISHING STONES			4				2			2						3		1		2					1	1		3														
PESTLES					3	2												1							1																	
METATES	TROUGH OPEN BOTH ENDS, OVAL BLOCK				1					1															1		1			1		1										
	TROUGH OPEN BOTH ENDS, RECTANGULAR BLOCK										3			1				1						1		1		1													1	
	TROUGH FRAGMENTS		3		1		3	2																																		
	TROUGH OPEN ONE END ONLY				1		1	1									1	1								2															
SMALL METATE-LIKE GRINDING STONES					1												1	1																							1		1
PAINTED SLABS					1	1			1					1		1		1		1	2																					
PAINT PALETTES																				1				1																	
STONE BOWLS OR MORTARS												1					1	2		1																					
WORKED SLABS				1					1			2			1	3		1								1																
CORN MOUNDS										1				1																												

FIG. 67. Occurrence of ground and pecked stone artifacts by rooms and levels, Higgins Flat Pueblo.



ARTIFACTS \ LOCATIONS	PLAZAS	TRENCHES	ROOM A FILL	ROOM A FLOOR 1	ROOM A FLOOR 2	ROOM A FLOOR 3	ROOM B FILL	ROOM B FLR 1	ROOM B FLR 2	ROOM C FILL	ROOM C FL 1	ROOM C SUB	ROOM D FILL	ROOM D FLOOR 1	ROOM D FLOOR 2	ROOM D SUB	ROOM E FILL	ROOM E FLOOR 1	ROOM E FLOOR 2	ROOM E FLOOR 3	ROOM E SUB	ROOM F FILL	ROOM F FLR 1	ROOM F FLR 2	ROOM G FILL	ROOM G FLR 2	ROOM G FLR 3	ROOM H FILL	ROOM H FLOOR 1	ROOM H FLOOR 2	ROOM H FLOOR 3	ROOM I FILL	ROOM I FLOOR 1	ROOM I FLOOR 2	ROOM I FLOOR 3	RM J FILL	RM J 1	ROOM K FILL	ROOM K FLOOR 1	ROOM K FLOOR 2	ROOM K FLOOR 3	ROOM L FILL	ROOM L FLOOR 1	ROOM L FLOOR 2	ROOM L FLOOR 3	ROOM M FILL	ROOM M FLOOR 1	ROOM M FLOOR 2	ROOM M FLOOR 3	RM N FILL	RM N FL. 1
HAMMERSTONES		1	1	2	2	3							1	2																	1																			
MAULS – FULL GROOVE													1																																					
– THREE QUARTER GROOVE		1							1																																								
AXES – FULL GROOVE														1												1											1												
– THREE QUARTER GROOVE		1			1	1																																										
ARROW SHAFT TOOLS				1		2			1	1																							1										1					
TCHAMAHIA				1																																												
SMOOTH SAW OR KNIFE		1				1																											1															
COLANDER											1																																						
ABRADING STONES					1	1				1	1		1	1			1																															
ANIMAL EFFIGIES – STONE																	2																																
PIPE																	1																																
PENDANTS – TABULAR						1																															1											
– GROOVED										1																																						
BEAD, STONE – DISC				1																																											
PROJECTILE POINTS – SMALL TRIANGULAR		1																											1	1		1									1					
– ONE SPECIMEN OF EACH TYPE	1		3	3				1						1					1			1			2			1																		
SAWS – CHIPPED			1	1						3												1																										
DRILLS – PLAIN SHAFT		1				1																																									1		
– FLANGED			1			1																																										
THIN FLAKES – KNIVES	3	4	6	3	12	5		2	8	2			1		3	3	3		4			1			6				1																		
RANDOM THICK FLAKES – SCRAPERS	1	3	10	2	11	5		3	7	1		3	1		1	2	7		2	7		2				6			1			1														
– LARGE, ROUGH			2				1						1		1				1																												
– SERRATE							1	1											1					1																							
CHOPPERS – UNIFACE								1					1	1			1																														
– BIFACE		1	2				2		1						1																																
BRACELETS – THIN				2	1		1	1		2			2					1							1																			1		
THICK					1		1	1																									1													
PENDANTS, SHELL				1		2										1																														.	1
BEADS, SHELL – DISC																		423	1																												
– CONUS TINKLER													1					12																														
– CYLINDRICAL					13																																1											
– DOUBLE LOBE																																																
AWLS: HEAD INTACT			3			1		1	1				1					1					1														1	2				1				1		
AWLS: SPLIT BONE	1		2	1	1					1						3		1	1				1					1				1				2					1	1	1				
AWLS: HEAD ALMOST REMOVED	1																																										2					
AWLS: HEAD REMOVED				2			1																										1													
AWLS: WRENCH COMBINATION								1																																					1		
AWLS: HOLLOW SHAFT											1																																				
AWLS: SPLINTER		1											1										1																						1		
AWLS: TIP FRAGMENTS			1		1		1	1		2	3				1			1							1				1			1													
BODKIN TIP								1																																							
FLAKERS				1							1																																				
FLESHERS											2																																				
RING								1																																							
WRENCH, ANTLER																																					1											
FLAKERS, ANTLER																	1					1			1											1											
WORKED SHERDS – SPINDLE WHORL		1	1					3							4	1																1														
– ROUNDED RECTANGLE		2			2		1	4		1				1	1		1															1														
ANIMAL EFFIGIES, CLAY		1					1			1																						1	1													
UNWORKED STONE	1		2			2		2						2	1				1							1										2					1		2				
TOTAL	37	26	80	63	59	43	37	23	32	34	23	8	28	21	29	13	29	19	46	22	2	7	4	1	14	13	13	7	10	7	8	3	2	17	3	11	14	0	0	4	2	5	1	9	1	0	6	12	3	1	7

FIG. 68 (fig. 67 *continued*). Occurrence of chipped stone, shell, and bone artifacts by rooms and levels, Higgins Flat Pueblo.

of traits seems to coincide with that of the Mogollon culture. It therefore suggests that further investigation may add these to the present list of "Late Mogollon" or "Western Pueblo" traits such as rectangular kivas, three quarters grooved axes, polished brown pottery, polychrome red ware, smudged bowl interiors, etc. (for a more complete list see Reed, 1950, pp. 120–138).

Although there were a number of innovations introduced during the Tularosa Phase and much of the culture was modified in the sense that new forms of artifacts became popular, for example, through trough metates rather than metates with the trough closed at one end, on the whole the culture, as revealed by the stone and bone tools, remained Mogollon in character. The few distinctive trait types such as serrate scrapers and uniface choppers had continued in use from Cochise times and at least two-thirds of the basic tools and artifacts, although more popular in later forms, had been in use since Cochise and Pine Lawn times. Thus, although a number of modifications or new forms of the artifacts had been introduced along with some innovations, they are fundamentally Mogollon in character, with ramifications in the direction of the Western Pueblo culture.

IV. Cordage and Textiles

By ELAINE A. BLUHM

CORDAGE

Fiber Cordage

Description: 2-yarn Z-twist cord, produced by twisting fibers together into S-twist yarns which were combined to form 2-yarn Z-twist strands (fig. 69, *a*). Strands vary from 1.8 to 3.5 mm. in diameter, with an angle of twist of 45 to 50 degrees.

Material: Condition too fragile to determine.

Hair Cord

Description: Two examples of hair fiber were found: (1) short, loose bunch of fibers twisted over a slender stick about 6 mm. in diameter; (2) short bunch of hair fiber, perhaps raw material prepared for making string.

Discussion

Charred remains of four bundles of fiber cordage were recovered from the floor of Room C. The fragile condition and short length made it impossible to tell what they originally represented. They could have been merely skeins of string, but there is also the possibility that they represent fragments of netting, string aprons, or sashes. No knotting was found on any of the specimens.

Previous research in the Reserve area (Martin and others, 1952, pp. 205–212, 215–217; Martin, Rinaldo, and Bluhm, 1954, pp. 159–164) has led to the conclusion that this is the most common type of cordage in the Mogollon area. Study of Hohokam (Haury, 1950, pp. 391–394) and Anasazi sites (Kidder and Guernsey, 1919, p. 113) indicates that it also predominates in those areas.

Hair cord occurs sporadically throughout time and space in the Southwest. While no hair fiber cord was found in Hinkle Park Cliff-Dwelling or Cosper Cliff-Dwelling, some specimens were un-

covered in the San Francisco-through-Tularosa levels of Tularosa Cave (Martin and others, 1952, p. 207, fig. 74), so the occurrence in Higgins Flat Pueblo confirms its use in the Tularosa Phase in the Reserve area.

CLOTH

Plain Weave Cloth

(Figure 69, *b*)

Description: Wefts woven in plain over-one-under-one weave across warps, 9 warps and 9 wefts per centimeter.

Material: Single ply Z-twist yarns, 0.4 to 0.6 mm. diameter, too fragile to determine type of fiber.

Fur or Feather Cloth?

Description: One large open weave fragment, too fragile to recover, was found over Burial 9. The specimen was believed to be a fur or feather cloth blanket.

Discussion

Plain weave cloth was the predominant type in the Southwest about A.D. 1200. Similar specimens have been reported from the late levels of Tularosa Cave (Martin and others, 1952, p. 299) and from Cosper Cliff-Dwelling in the Blue River valley (Martin, Rinaldo and Bluhm, 1954, p. 170) in the Mogollon area. Many examples have been reported from Pueblo III sites in the Anasazi area (Fewkes, 1909, p. 45, and 1911, p. 76; Judd, 1931, p. 63; Kidder and Guernsey, 1919, p. 115; Tschopik, *in* Kluckhohn and Reiter, 1939, p. 96). The association of the small cloth fragments with burials suggests that the inhabitants of Higgins Flat Pueblo may have practiced the custom of wrapping burials in blankets as did the Hohokam of Ventana Cave (Haury, 1950, p. 447, pl. 50) and the Pueblo people of the Verde Valley (Morris, 1929, pp. 94–95) and the Sierra Ancha area (Haury, 1934, p. 146).

The possible fur or feather cloth fragment was found over Burial 9. A female burial in Tularosa Cave was wrapped in fur and feather cloth blankets (Martin and others, 1952, pp. 247, 459). One feather cord blanket occurred in a San Francisco-through-Tularosa level of Tularosa Cave (Martin and others, 1952, fig. 85) and although no

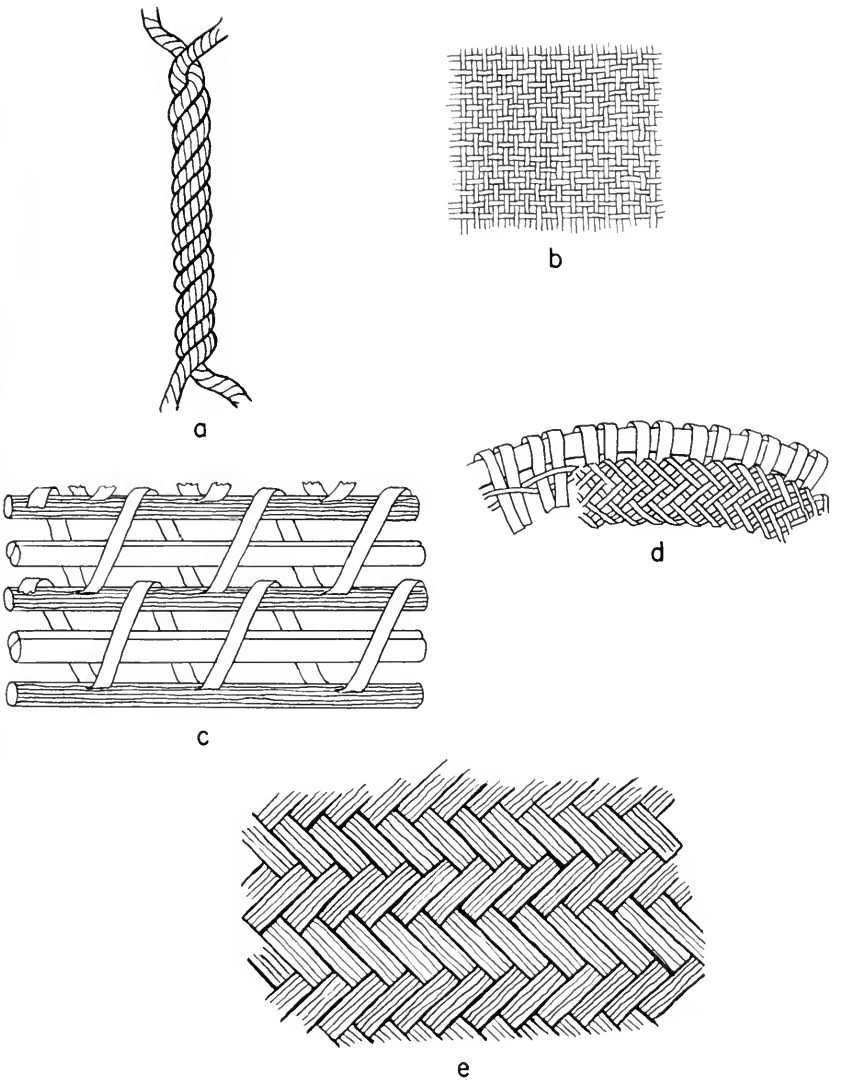


FIG. 69. Drawings showing cordage and textile specimens: 2-yarn Z-twist cord (S-twist yarn) (*a*); plain over-one-under-one weave cloth (*b*); 2-rod-and-bundle bunched basketry foundation with non-interlocking stitches (*c*); twilled ring basket fragment with decorative braid attached (*d*); over-three-under-three twilled mat fragment (*e*).

woven specimens were reported, pieces of fur and feather cordage were found in Reserve Phase levels of O Block Cave and in the transitional Reserve-Tularosa occupation of Hinkle Park Cliff-Dwelling.

Both fur and feather cloth occur in Pueblo III in the Anasazi area (Fewkes, 1911, p. 76; Kidder and Guernsey, 1919, p. 118; Morris, 1911, p. 179, and 1919, p. 47) although there is more feather cord used at that time than fur cord.

Fur cloth blankets were also found in association with burials in levels dating from about A.D. 1000 to 1400 in Ventana Cave in the Hohokam area (Haury, 1950, pp. 430–432).

BASKETRY

Coiled, Two-Rod-and-Bundle Bunched Foundation

(Figure 69, *c*)

Description: Sewing splints encircle the two-rod-and-bundle bunched foundation of the coil and part of the bundle of the coil below. Stitch slant is /. Two to 2½ coils and 7 stitches per centimeter. Stitches non-interlocking and occasionally split; foundation not entirely covered as stitches not always evenly spaced. Fragments too fragile to determine splicing techniques.

One round center fragment found. Length of foundation about 2 cm. long was wrapped with sewing splints and bent into circle; subsequent coils wrapped around this and held in place by sewing in the usual manner.

Material: Rods are slender woody shoots; sewing elements flexible wood splints 0.5 to 2 mm. wide.

Twilled Ring Basket?

(Figure 69, *d*)

Description: Fragment of edge, weave of basket not known. Ends of elements bent over slender stick 5 mm. diameter, and held in place by pair of 2-yarn Z-twist cords twined across below ring. Ends of elements covered with 8 element braid, 1.3 cm. wide, plaited in over-two-under-two weave and attached to basket.

Material: Basket-strips of sotol (*Dasylirion*) 3 to 4 mm. wide; braid-strips 1 to 2 mm. wide.

Discussion

Two-rod-and-bundle bunched foundation coiled basketry is found throughout the Southwest. Examples are known from Tularosa and Cordova Caves (Martin and others, 1952, fig. 85), and from O Block Cave (Martin, Rinaldo, and Bluhm, 1954, p. 173) and the caves of the upper Gila (Cosgrove, 1947, pp. 99–105). The occurrence of this type at Higgins Flat Pueblo confirms the suggestion that the type was known after the San Francisco Phase in the Reserve area. We may conclude, therefore, that this type of basketry is important from early to late in both the Mogollon and Anasazi areas (Morris and Burgh, 1941, p. 12). In the Hohokam area the type is known, but does not predominate (Haury, 1950, pp. 403–407).

The fragmentary specimen of a twilled ring basket is similar to others from the late levels of Tularosa Cave (Martin and others, 1952, p. 312), although the braid which finished the edge of the latter specimens was woven of the ends of the plaited elements rather than being made separately and fastened to the edge of the basket. This specimen, from the southeast quadrant of the floor of Room C, contained nuts when recovered.

Twilled ring baskets occur in Anasazi sites from Basketmaker II through Pueblo IV, and Morris and Burgh (1941, p. 23) describe some from late Pueblo III at Mesa Verde which have ornamented rims similar to the one described above. Twilled basketry is known earlier in the Anasazi area to the north, and seems to have been more highly developed there than in the Mogollon area.

TWILLED MATTING

(Figure 69, *e*)

Description: Elements woven in over-three-under-three or less frequently over-two-under-two pattern. Plaiting is firm with little space between elements. No fragments with selvages.

Material: Strips of sotol (*Dasylirion*) 3 to 7 mm. wide.

Discussion

The distribution of twilled matting fragments in Tularosa Cave (Martin and others, 1952, fig. 86) suggested that that type of matting was more popular in the late phases of Mogollon than before. Evidence from Hinkle Park Cliff-Dwelling and O Block Cave,

excavated in 1951 (Martin, Rinaldo, and Bluhm, 1954, p. 173), and now Higgins Flat Pueblo has confirmed that conclusion. More twilled matting was recovered from the pueblo than any other type of perishable specimen. The matting seems to have served several functions in the Tularosa Phase rooms: as covering for flour receptacles recessed in the floor, as floor covering either as bedding or as a place to put food, and as wrapping around burials. Over-three-under-three is the predominant weave in the Mogollon twilled matting, although over-two-under-two is also known.

Some examples of twilled matting have been found in Basketmaker II caves (Kidder and Guernsey, 1919, pp. 170–171), but it is more common in Pueblo III (Haury, 1945b, p. 84; Judd, 1931, p. 63; Kidder and Guernsey, 1919, pp. 111–112) and Pueblo IV sites (Haury, 1934, pl. LIV, *b*, *d*, pp. 81–83; Kidder, 1932, p. 300) in the Anasazi area.

Small fragments have also been found in Ventana Cave (Haury, 1950, p. 402) and impressions were found at Snaketown in the Sacaton Phase (Gladwin and others, 1937, p. 159). Twilled matting would seem, therefore, to have widespread distribution in the Southwest after A.D. 1000.

SUMMARY AND CONCLUSIONS

(Figure 70)

Of a total of 32 perishable cordage and textile specimens recovered from Higgins Flat Pueblo 6 are cordage, 4 cloth, 4 basketry, and 18 matting. All of the specimens recovered confirmed previous conclusions as to their presence during the Tularosa Phase in the Reserve area.

Two-yarn Z-twist cord (S-twist yarn) is the predominant type in the Mogollon area from early to late, and, in fact, is the usual type found in sites throughout the Southwest. Hair cord also enjoys a long time span in the Southwest, but never represents a very large percentage of the total cordage count at any site.

The plain over-one-under-one weave cloth and fur or feather cloth associated with the burials present no new evidence, as both types have been found in the Reserve and Tularosa Phases before. These specimens also have a wide distribution throughout the Southwest. It is interesting to note that while we have found fur and feather cloth associated with burials in previously excavated

ARTIFACTS / LOCATION	CORD		CLOTH			BASKETRY		TWILLED MATTING		
	2-YARN Z-TWIST	HAIR FIBER	PLAIN OVER-ONE-UNDER-ONE WEAVE	WEAVE ?	FUR OR FEATHER ?	COILED, TWO-ROD-&-BUNDLE	TWILLED RING	OVER-THREE-UNDER-THREE WEAVE	OVER-TWO-UNDER-TWO WEAVE	? WEAVE
ROOM C, FLOOR	4	2				3	1	12		
BURIAL 3, ROOM A				1°						1°
BURIAL 7, ROOM A									1°	
BURIAL 8, ROOM A			2							1°
BURIAL 9, ROOM A					1°				1°	
BURIAL H-1, ROOM H								1°		
BURIAL N-1, ROOM N								1		
TOTAL	4	2	2	1	1	3	1	14	2	2

° SPECIMENS DESCRIBED IN FIELD, TOO FRAGILE TO RECOVER AND RETURN TO MUSEUM.

PY

FIG. 70. Occurrence of cordage and textile specimens by rooms, Higgins Flat Pueblo.

sites, this is the first suggestion of the occurrence of plain weave cloth with burials in the Mogollon area.

The two examples of two-rod-and-bundle bunched foundation coiled basketry definitely establishes this as a Tularosa Phase trait; previously the latest occurrence had been in the San Francisco-through-Tularosa mixed levels of Tularosa Cave. Although this type of coiled foundation is found in Hohokam, Mogollon, and Anasazi sites, it is less frequent in the Hohokam area than in the latter two, where it predominates.

Twilled ring baskets were found in Reserve-Tularosa levels of Tularosa Cave, and the Higgins Flat Pueblo specimen adds further evidence of their occurrence at that time in the Reserve area. The presence of an ornamental braid added to the rim of the basket to cover the rough ends of the elements is a new trait in the Mogollon area, but also has been found in late Pueblo III sites in the Mesa Verde area. Twilled basketry seems to be a northern trait which has moved south, for it is found earlier in the Anasazi sites than in the Mogollon. A few specimens occurred in Ventana Cave.

The quantity of twilled matting in Higgins Flat Pueblo confirms the suggestion made on the basis of the Tularosa Cave material that this type became more important toward the end of the occupation of the cave and of the Mogollon sequence. It seems to be the predominant type of matting in the Reserve and Tularosa Phases of the Mogollon area. For the first time we have definite information as to the use of matting for wrapping burials, covering flour receptacles, and on the floors of the rooms.

Twilled matting occurs as early as Basketmaker II in the Anasazi area, but there too it becomes more important with the passage of time to Pueblo III and IV. A few fragments also are found in the late phases in the Hohokam area, so it seems to be an important and widespread trait in the Southwest after A.D. 1000.

The textile fragments from the Tularosa Phase occupation of Higgins Flat Pueblo resemble more closely those found in the Anasazi area at the same period than collections from earlier phases in Tularosa and Cordova caves do. Here, too, we see the indications of the southward movement of the Anasazi influences and/or peoples as reflected in architecture and ceramic and lithic traits after A.D. 1000. Comparison of perishable collections from the Hohokam, Mogollon and Anasazi areas indicates greater similarity of these materials throughout the Southwest after A.D. 1000 than before.

V. Pottery

By PAUL S. MARTIN

Some 40,000 sherds were recovered from the excavations in the rooms, in the midden, and in the exploratory trenches adjacent to the pueblo. Analysis of the pottery was done daily in the field and the pottery classified according to the typologies established by Gila Pueblo, the Museum of Northern Arizona, and the University of Arizona. All the pottery fitted the categories or types already established by the institutions named above (for a list of pottery types by phases see Martin, Rinaldo and Bluhm, 1954, and Martin and others, 1952).

The sherds from the rooms were divided into two classes: "fill" and "floor." Floor sherds were identified as those resting on the floor plus those in the first 10 cm. of fill above the floor. Table 1, embodying pottery types, sherd counts and percentages for the excavations, accompanies this chapter. A bar graph (fig. 71) showing the frequencies of pottery types and seriation for the rooms of the pueblo is also presented.

In addition to the thousands of sherds, we recovered 88 whole or restorable vessels. A list of types follows:

Alma Rough (jar)	1
Alma Plain (jars)	3
San Francisco Red (1 bowl, 2 jars)	3
Reserve Smudged (bowls)	3
Reserve Black-on-White (duck effigy jar) (fig. 72)	1
St. Johns Polychrome (bowls) (figs. 73, 74)	7
Tularosa Black-on-White (1 bowl, 9 jars) (figs. 75–77)	10
Tularosa White-on-Red (bowls)	3
Puerco Black-on-White (jar)	1
Tularosa Patterned Corrugated (jars) (fig. 78)	3
Reserve Indented Corrugated (18 jars, 4 bowls, interiors smudged) (fig. 79)	22
Tularosa Fillet Rim (bowls)	29
Tularosa Indented Corrugated (bowls, 12–15 corrugations to the inch, smudged interiors)	2
Total, whole or restorable vessels	88

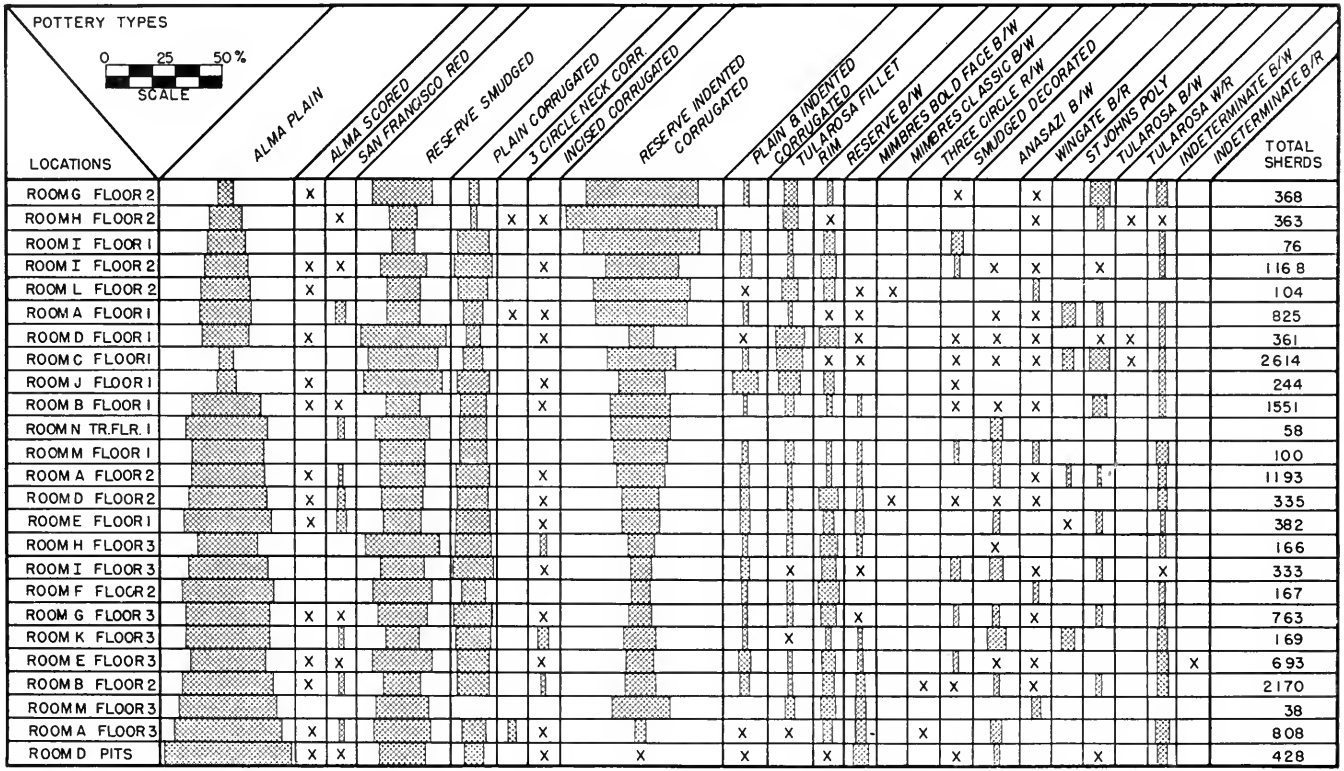


FIG. 71. Relationships of pottery types by floor levels, Higgins Flat Pueblo.

I also present herewith a listing of these same whole or restorable vessels by find-spots.

ROOM A

Fill:
- Tularosa Black-on-White jar 1
- Reserve Indented Corrugated jars 3
- Tularosa Fillet Rim bowls 3

Total, fill, Room A 7

Floor 1 (latest occupation):
- St. Johns Polychrome bowls 2
- Reserve Indented Corrugated jars 3
- Reserve Indented Corrugated bowl (smudged interior) 1
- Tularosa Fillet Rim bowls 4

Total, Floor 1, Room A 10

Below Floor 1 (between Floors 1 and 2) with burial 7:
- Tularosa Patterned Corrugated jar 1

On Floor 2, with burial 9:
- Alma Plain jar 1
- Tularosa Fillet Rim bowls 3

Below Floor 2, with burial 8:
- Alma Plain jar 1
- Reserve Indented Corrugated bowl (smudged interior) 1
- Tularosa Fillet Rim bowls 2

Below Floor 2 and under west wall, in northwest corner, with burial 10:
- Alma Rough jar 1
- Reserve Smudged bowls 2

Total, below Floor 1 12

Total, Room A 29

ROOM B

Fill:
- Reserve Indented Corrugated jars 3

Floor 1:
- Tularosa Black-on-White jar 1

Floor 2:
- Tularosa Patterned Corrugated jar 1
- Tularosa Fillet Rim bowl 1

Total, Room B 6

ROOM C

Fill:

St. Johns Polychrome bowls	3
Tularosa Black-on-White jars	6
Tularosa White-on-Red bowls	2
Tularosa Patterned Corrugated jar	1
Reserve Indented Corrugated jar	1
Total, fill	13

Floor 1:

San Francisco Red bowl	1
St. Johns Polychrome bowl	1
Tularosa Black-on-White bowl	1
Reserve Indented Corrugated bowl and jar	2
Tularosa Fillet Rim bowls	6
Total, Floor 1	11

Floor 2:

Reserve Smudged bowl	1
Reserve Indented Corrugated jar	1
Total, Floor 2	2
Total, Room C	26

ROOM D

Fill:

Tularosa Black-on-White jar	1
Tularosa White-on-Red bowl	1
Reserve Indented Corrugated jar	1
Reserve Indented Corrugated bowl (smudged interior)	1
Tularosa Fillet Rim bowls	2
Total, fill	6

Floor:

Tularosa Fillet Rim bowls	5
Total, floor	5
Total, Room D	11

ROOM E

Fill:

Reserve Indented Corrugated jar	1

Between Floors 1 and 2:

San Francisco Red jar (with burial E1)	1

Floor 2:

San Francisco Red jar	1

Floor 3:

Tularosa Indented Corrugated bowls (smudged interior)	2
Total, Room E	5

ROOM G

Floor 2:
Reserve Black-on-White duck effigy jar 1
Total, Room G 1

ROOM H

Floor 1:
Reserve Indented Corrugated jar 1

Floor 2:
Reserve Indented Corrugated jars 2

Below Floor 3:
Tularosa Fillet Rim bowl 1
Alma Plain jar (with burial H1) 1
Total, Room H 5

ROOM K

Floor 3:
Puerco Black-on-White jar 1
Total, Room K 1

ROOM M

Floor:
Reserve Indented Corrugated jar 1
Total, Room M 1

ROOM N

Fill:
St. Johns Polychrome bowl 1
Tularosa Fillet Rim bowl 1

Floor 1:
Tularosa Fillet Rim bowl 1
Total, Room N 3
Total, whole or restorable vessels 88

TRENDS IN CERAMIC POPULARITY

As stated earlier in this section, the dirt in the rooms of Higgins Flat Pueblo was excavated in several levels: fill and floors. The dirt in the trash heaps was removed by squares (one meter square) and levels (20 cm. per level). The maximum thickness of trash in the middens was 80 cm.; the minimum, about 20 cm.

FIG. 72. Reserve Black-on-White duck effigy jar, lower floor, Room G. Height, 19.7 cm.

FIG. 73. St. Johns Polychrome bowl, Floor 1, Room A. Diameter, 29.1 cm.

FIG. 74. St. Johns Polychrome bowl, Floor 1, Room A. Diameter, 31.6 cm.

The percentages of each pottery type (about 40 types) were calculated for the levels in the rooms and for each of the levels in the middens. Since the pottery types in the refuse areas demonstrated the same general typological similarities and frequencies as occurred in the rooms proper, we have omitted these tabulations from this report. The sherd counts and percentages for the levels in the rooms proper—fill and floors—are listed in Table 1.

The percentages for each pottery type found on the floors of the rooms were plotted on a bar-type graph. The bars were cut up horizontally and placed serially on a graph (fig. 71). The assumptions used in ranking these bars (or percentages) by rooms were based on the sequences of pottery types for the Pine Lawn-Reserve area as established from stratigraphic and other data (Martin, 1943; Martin and Rinaldo, 1940, 1947, 1950a; Martin, Rinaldo, and Antevs, 1949; Martin and others, 1952; Martin, Rinaldo, and Bluhm, 1954).

The graph as given in figure 71 would probably merge with the upper part of the graph for Hinkle Park Cliff-Dwelling pottery

FIG. 75. Tularosa Black-on-White bowl, Floor 1, Room C. Diameter, 17.9 cm.

sequences (Martin, Rinaldo, and Bluhm, 1954, fig. 25). In other words, we sense that Higgins Flat Pueblo is chronologically a little later than Hinkle Park. An inspection of the graph (fig. 71) will show that the pits in Room D and Floor 3 in Room A are the earliest parts of the pueblo, and that Floor 2 in Room G is one of the latest occupation levels.

The order in which the rooms were built as determined by this seriation coincides well with that which was worked out by Rinaldo (pp. 48–54), who used data other than those furnished by ceramics. Thus, the first rooms to be built were probably A, B-1, E, D-K, M; the second batch consisted of Rooms F, H, I, J, L; and the last ones to be added were B, C, G, and N.

It should be noted that the occupants of the pueblo continued to use the old rooms even after new ones were built; for example, when the second string of rooms was added, the Indians lugged a lot of dirt into Room A and established a new floor level there (Floor 2) 35 cm. above the earliest floor and re-established home

FIG. 76. Tularosa Black-on-White jar, floor, Room C. Height, 23.1 cm.

and hearth "on a higher plane!" Such additions and alterations may have been regarded more or less as our old spring housecleaning days were looked upon. Life went on, while mother supervised rug-beating, painting, and perhaps alterations.

It is for this reason that we have not included Rooms A, B-1, E, and D-K in our second batch. These rooms were there and remained in use.

I should explain that B-1 refers to the eastern part of E before the part labeled B-1 became Room B. Rooms D-K were, in the nuclear stage, actually part of A when it was a kiva and before alterations took place. Room G (Floor 3), according to the ceramic seriation, should have been part of one of the nuclear rooms; but on the basis of evidence from masonry, abutments, bonds, and floor level we felt it had to be placed with the rooms that were added last. This is the one place where our seriation does not fit the architec-

FIG. 77. Tularosa Black-on-White jar, fill, Room A. Height, 23.0 cm.

tural evidence. We don't know why there is a discrepancy. Perhaps our pottery classification or count was wrong, our analysis of architectural details incorrect, or our digging faulty.

A few trends that show up in the graph (fig. 71) may be pointed out:

1. Alma Plain decreases in popularity.
2. San Francisco Red has become almost extinct.
3. Reserve Smudged and Tularosa Fillet Rim might be lumped together because from sherds only it is difficult if not impossible to tell one from the other, unless rims are present. At any rate, these types increase in popularity towards the end of the life of the pueblo, and thereafter decline slightly.
4. Reserve Indented Corrugated increases markedly in popularity and appears to be replacing Plain Corrugated.
5. Reserve Black-on-White appears to decline slightly in strength, while Tularosa Black-on-White, the ceramic derivative of Reserve Black-on-White, becomes somewhat more popular.

FIG. 78. Tularosa Patterned Corrugated jar, Floor 2, Room B. Height, 22.8 cm.

FIG. 79. Reserve Indented Corrugated jar, Floor 1, Room A. Height, 26.4 cm.

6. Painted and textured wares are slowly replacing plain wares —a trend that was under way for about 500 years.

FIG. 80. Miniature vessels. Height of left specimen, 5.3 cm.

GENERAL REMARKS

From a study of the sherds and whole vessels, we can state what shapes were the most popular for many pottery types:

Alma Plain and Alma Rough: jars.

San Francisco Red: mostly jars, occasionally a bowl.

Reserve Smudged: bowls.

Reserve Black-on-White: jars; a few bowls.

Smudged Decorated: bowls.

St. Johns Polychrome: bowls.

Tularosa Black-on-White: jars; one bowl.

Tularosa White-on-Red: bowls.

Tularosa Patterned Corrugated: jars.

Plain Corrugated: jars; a few bowls.

Reserve Indented Corrugated: shapes about evenly divided between jars and bowls, both of which have smudged interiors.

Plain and Indented Corrugated (alternating bands): jars.

Tularosa Fillet Rim: bowls.

Few ladles and no mugs were found. The important forms appear to have been jars, pitchers, and bowls plus a few plain ware miniatures (fig. 80).

About 90 per cent of the pottery from Higgins Flat Pueblo was assigned to the Mogollon Brown Ware. The remainder ("trade" sherds; about 10 per cent) was assigned to White Mountain Red Ware: St. Johns Polychrome and Wingate Black-on-Red; and to

the following black-on-white series: Kiatuthlanna, Mimbres Bold Face, Mimbres Classic, Puerco, and Red Mesa.

Attention is called to the clear association of Reserve Black-on-White and Mimbres Bold Face Black-on-White types in the earlier levels of the pueblo rooms and of the trash debris.

All the pottery that we found was made by the coiling process, that is, a "rope" of clay was spiraled upward to the desired height. Afterwards the vessel walls were thinned by scraping. After this process, the vessel was permitted to dry and the surfaces were then either slipped and/or painted or were textured by means of a tool or a fingernail.

On the basis of these ceramic data, we conclude that Higgins Flat Pueblo would fall within the Tularosa Phase and was probably occupied about A.D. 1200 to 1250.

TABLE 1.—SHERD ANALYSIS

ROOM A, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	440	19.64	181	21.94	353	29.59	370	45.79
Alma Rough	...	.....	...	.....	...	.....	1	0.12
San Francisco Red	88	3.93	13	1.58	6	0.50	10	1.24
San Francisco Red, smudged interior	...	.....	23	2.79	6	0.50	...	.....
Reserve Smudged	401	17.90	106	12.85	243	20.37	184	22.77
Total	929	41.47	323	39.16	608	50.96	565	69.92
Reserve B/W	16	0.71	2	0.24	22	1.84	19	2.35
St. Johns Polychrome	53	2.37	39	4.73	17	1.43	...	.....
Three Circle R/W	1	0.04	...	.....	...	.....	1	0.12
Tularosa B/W	131	5.85	34	4.12	30	2.51	...	.....
Mogollon Red-on-Brown	...	.....	...	.....	...	.....	1	0.12
Total	201	8.97	75	9.09	69	5.78	21	2.59
White Mound	...	.....	...	.....	...	.....	3	0.37
Kiatuthlanna B/W	6	0.27	1	0.12	7	0.59	1	0.12
Mimbres Bold Face B/W	12	0.54	5	0.61	13	1.09	19	2.35
Mimbres Classic B/W	1	0.04	...	.....	...	.....	...	.....
Puerco B/W	...	.....	...	.....	1	0.08	...	.....
Red Mesa B/W	1	0.04	...	.....	7	0.59	29	3.59
Wingate B/R	2	0.09	5	0.61	5	0.42	...	.....
Indeterminate B/W	37	1.65	11	1.33	31	2.60	39	4.83
Indeterminate B/R	1	0.04	...	.....	...	.....	...	.....
Total	60	2.67	22	2.67	64	5.37	91	11.26

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM A, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Incised	1	0.04	...	.....	...	.....	...	.....
Alma Punched	2	0.09	...	.....	1	0.08	2	0.25
Alma Scored	...	.....	...	.....	...	.....	1	0.12
Incised Corrugated	6	0.27	2	0.24	2	0.17	4	0.49
Incised Corrugated, smudged interior	...	.....	1	0.12	...	.....	...	.....
Tularosa Patterned Corrugated	33	1.47	11	1.33	7	0.59	...	.....
Tularosa Patterned Corrugated, smudged interior	3	0.13	...	.....	1	0.08	...	.....
Plain Corrugated	169	7.54	54	6.55	128	10.73	71	8.79
Plain Corrugated, smudged interior	62	2.77	2	0.24	28	2.35	1	0.12
Plain and Indented Corrugated	5	0.22	...	.....	15	1.26	7	0.87
Plain and Indented Corrugated, smudged interior	3	0.13	...	.....	6	0.50	...	.....
Punched Corrugated	3	0.13	...	.....	...	.....	...	.....
Reserve Indented Corrugated	647	28.88	282	34.18	211	17.69	23	2.85
Indented Corrugated, smudged interior	24	1.07	36	4.36	28	2.35	...	.....
Red Indented Corrugated	1	0.04	2	0.24	...	.....	...	.....
Three Circle Neck Corrugated	...	.....	1	0.12	...	.....	14	1.73
Tularosa Fillet Rim	88	3.93	14	1.70	19	1.68	8	0.99
Tularosa Fillet Rim, San Francisco Red interior	...	.....	...	.....	6	0.50	...	.....
Handles	3	0.13	...	.....	...	.....	...	.....
Total	1050	46.84	405	49.08	452	37.98	131	16.21
Grand Total	2240	99.95	825	100.00	1193	100.09	808	99.98

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM B, HIGGINS FLAT PUEBLO

	Fill		Upper Floor		Lower Floor	
	No.	%	No.	%	No.	%
Alma Plain	355	24.60	451	29.08	873	40.23
Alma Rough	...	.....	4	0.26	...	.....
San Francisco Red	17	1.18	12	0.77	26	1.20
San Francisco Red, smudged interior	1	0.07	...	.....	...	.....
Reserve Smudged	152	10.53	236	15.22	347	15.99
Alma Plain lug	1	0.07	...	.....	...	.....
Total	526	36.45	703	45.33	1246	57.42
Reserve B/W	18	1.25	35	2.26	58	2.67
Smudged Decorated	2	0.14	3	0.19	8	0.37
St. Johns Polychrome	1	0.07	...	.....	...	.....
Three Circle R/W	...	.....	...	.....	1	0.05
Tularosa B/W	65	4.50	81	5.22	35	1.61
Total	86	5.96	119	7.67	102	4.70
Gray ware	2	0.14	...	.....	...	.....
Kiatuthlanna B/W	5	0.35	7	0.45	9	0.41
Mimbres Bold Face B/W	5	0.35	18	1.16	39	1.80
Mimbres Classic B/W	1	0.07	...	.....	...	.....
Puerco B/W	...	.....	...	.....	2	0.09
Red Mesa B/W	...	.....	...	.....	16	0.74
Wingate B/R	1[1]	0.07	4	0.26	3	0.14
Indeterminate B/W	14	0.97	24	1.55	61[2]	2.81
Indeterminate B/R	8	0.55	...	.....	...	.....
Total	36	2.50	53	3.42	130	5.99

[1] Wingate: interior B/R; exterior corrugated.

[2] Includes one sherd noted "B/R(Poly.?) type?"

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM B, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Upper Floor		Lower Floor	
	No.	%	No.	%	No.	%
Alma Neck Banded	11	0.76	...	.....	...	.....
Alma Punched	1	0.07	5	0.32	3	0.14
Alma Scored	4	0.28	...	.....	6	0.28
Incised Corrugated	4	0.28	6	0.38	18	0.83
Incised Corrugated, smudged interior	...	.....	...	.....	3	0.14
Tularosa Patterned Corrugated	4	0.28	5	0.32	38	1.75
Tularosa Patterned Corrugated, smudged interior	2	0.14	3	0.19	...	.....
Plain Corrugated	125	8.67	154	10.00	274	12.63
Plain Corrugated, smudged interior	21	1.45	17	1.10	31	1.43
Plain and Indented Corrugated	3	0.21	10	0.64	6	0.28
Plain and Indented Corrugated, smudged interior	6	0.42	2	0.13	3	0.14
Punched Corrugated	...	.....	2	0.13	2	0.09
Reserve Indented Corrugated	533	36.93	396	25.53	259	11.93
Indented Corrugated, smudged interior	45	3.12	40	2.58	22	1.01
Red Indented Corrugated	...	.....	3	0.19	...	.....
Three Circle Neck Corrugated	3	0.21	...	.....	...	.....
Tularosa Fillet Rim	30	2.10	33	2.13	27	1.24
Tularosa Fillet Rim, San Francisco Red interior	3	0.21	...	.....	...	.....
Total	795	55.13	676	43.64	692	31.89
Grand Total	1443	100.04	1551	100.06	2170	100.00

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM C, HIGGINS FLAT PUEBLO

	Fill		Floor		Below Floor	
	No.	%	No.	%	No.	%
Alma Plain	158	7.10	159	6.08	104	18.41
Alma Rough	...	.....	2	0.08	...	.....
San Francisco Red	20	0.90	24	0.92	2	0.35
San Francisco Red, smudged interior	3	0.13	...	.....	...	.....
Reserve Smudged	402	18.06	745	28.50	76	13.45
Exterior painted red; interior smudged	1	0.04	...	.....	...	.....
Total	584	26.23	930	35.58	182	32.21
Reserve B/W	11	0.49	8	0.31	17	3.01
Smudged Decorated	1	0.04	1	0.04	5	0.88
St. Johns Polychrome	56	2.52	98	3.75	...	.....
Tularosa B/W	189	8.49	250	9.56	4	0.71
Tularosa W/R	22	0.99	6	0.23	...	.....
Abajo Red-on-Orange (Dragoon R/B?)	1	0.04	1	0.04	...	.....
Both exterior and interior B/R (? R/W?)	10	0.45	1	0.04	...	.....
Total	290	13.02	365	13.97	26	4.60
Lino B/G	1	0.04	3	0.11	...	.....
Kiatuthlanna B/W	2	0.09	1	0.04	8	1.42
Mimbres Bold Face B/W	1	0.04	9	0.34	6	1.06
Red Mesa B/W	4	0.18	3	0.11	13	2.30
Wingate B/R	9	0.40	2	0.08	2	0.35
Indeterminate B/W	51	2.29	35	1.34	7	1.24
Total	68	3.04	53	2.02	36	6.37

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM C, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor		Below Floor	
	No.	%	No.	%	No.	%
Alma Scored	...	.....	...	.....	1	0.18
Incised Corrugated	3	0.13	...	.....	5	0.88
Tularosa Patterned Corrugated	67	3.01	14	0.54	2	0.35
Tularosa Patterned Corrugated, smudged interior	11	0.49	12	0.46	...	.....
Plain Corrugated	89	4.00	105	4.02	69	12.21
Plain Corrugated, smudged interior	19	0.85	82	3.14	10	1.77
Plain and Indented Corrugated	22	0.99	11	0.42	4	0.71
Plain and Indented Corrugated, smudged interior	...	.....	1	0.04	6	1.06
Reserve Indented Corrugated	569	25.56	655	25.06	197	34.87
Indented Corrugated, smudged interior	276	12.40	100	3.83	17	3.01
Red Indented Corrugated	5	0.22	5	0.19	...	.....
Tularosa Fillet Rim	222	9.97	281	10.75	9	1.59
Tularosa Fillet Rim, interior not smudged	1	0.04	...	.....	...	.....
Alma Knobby	...	.....	...	.....	1	0.18
Total	1284	57.66	1266	48.45	321	56.81
Grand Total	2226	99.95	2614	100.02	565	99.99

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM D, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	201	24.33	70	19.39	105	31.34	247	57.71
Alma Rough	1	0.12	...	.....	...	.....	...	.....
San Francisco Red	15	1.82	...	.....	7	2.09	3	0.70
San Francisco Red, smudged interior	4	0.48	...	.....	...	.....	...	.....
Reserve Smudged	215	26.03	131	36.29	59	17.61	81	18.93
Total	436	52.78	201	55.68	171	51.04	331	77.34
Reserve B/W	18	2.18	31	8.59	24	7.16	4	0.93
Smudged Decorated	2	0.24	3	0.83	2	0.60	2	0.47
St. Johns Polychrome	1	0.12	...	.....	...	.....	...	.....
Tularosa B/W	44	5.33	1	0.28	...	.....	2	0.47
Tularosa W/R	8	0.97	3	0.83	...	.....	...	.....
Total	73	8.84	38	10.53	26	7.76	8	1.87
Lino Gray	...	.....	...	.....	...	.....	1	0.23
Kiatuthlanna B/W	...	.....	...	.....	...	.....	1	0.23
Mimbres Bold Face B/W	4	0.48	3	0.83	6	1.79	19	4.44
Mimbres Classic B/W	2	0.24	...	.....	1	0.30	...	.....
Puerco B/W	...	.....	...	.....	...	.....	3	0.70
Red Mesa B/W	3	0.36	1	0.28	1	0.30	3	0.70
Wingate B/R	...	.....	1	0.28	1	0.30	...	.....
Indeterminate B/W	10	1.21	4	1.11	10	2.99	14	3.27
Total	19	2.29	9	2.50	19	5.68	41	9.57

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM D, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Punched	1	0.12	...	.....	1	0.30	...	.....
Alma Scored	1	0.12	1	0.28	...	.....	1	0.23
Incised Corrugated	2	0.24	1	0.28	2	0.60	1	0.23
Tularosa Patterned Corrugated	2	0.24	1	0.28	1	0.30	...	.....
Plain Corrugated	59	7.14	17	4.71	46	13.73	28	6.54
Plain Corrugated, smudged interior	7	0.85	3	0.83	...	.....	...	.....
Plain and Indented Corrugated	2	0.24	1	0.28	9	2.69	2	0.47
Plain and Indented Corrugated, smudged interior	1	0.12	...	.....	...	.....	...	.....
Punched Corrugated	...	.....	...	.....	...	.....	1	0.23
Reserve Indented Corrugated	82	9.93	28	7.76	24	7.16	1	0.23
Indented Corrugated, smudged interior	46	5.57	7	1.94	29	8.66	...	.....
Red Indented Corrugated	...	.....	3	0.83	...	.....	...	.....
Three Circle Neck Corrugated	...	.....	...	.....	...	.....	14	3.27
Tularosa Fillet Rim	95	11.50	51	14.13	7	2.09	...	.....
Total	298	36.07	113	31.32	119	35.53	48	11.20
Grand Total	826	99.98	361	100.03	335	100.01	428	99.98

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM E, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	236	26.52	140	36.65	284	45.44	220	31.75
Alma Rough	7	0.79	...	.....	3	0.48	...	.....
San Francisco Red	38	4.27	13	3.40	10	1.60	1	0.14
San Francisco Red, smudged interior	...	.....	...	.....	1	0.16	...	.....
Reserve Smudged	134	15.06	57	14.92	91	14.56	175	25.25
Total	415	46.64	210	54.97	389	62.24	396	57.14
Reserve B/W	25	2.81	9	2.36	54	8.64	44	6.35
Smudged Decorated	2	0.22	...	.....	11	1.76	14	2.02
St. Johns Polychrome	...	.....	1	0.26	...	.....	...	.....
Tularosa B/W	2	0.22	7	1.83	14	2.24	...	.....
Tularosa W/R	1	0.11	...	.....	...	.....	...	.....
Total	30	3.36	17	4.45	79	12.64	58	8.37
Puerco B/R	...	.....	...	.....	4	0.64	...	.....
Kiatuthlanna B/W	...	.....	4	1.05	1	0.16	...	.....
Mimbres Bold Face B/W	15	1.69	10	2.62	5	0.80	9	1.30
Mimbres Classic B/W	...	.....	...	.....	1	0.16	...	.....
Puerco B/W	...	.....	...	.....	1	0.16	...	.....
Red Mesa B/W	1	0.11	3	0.79	3	0.48	6	0.87
Wingate B/R	5	0.56	...	.....	1	0.16	1	0.14
Indeterminate B/W	19	2.13	5	1.31	29	4.64	17	2.45
Indeterminate B/R	...	.....	...	.....	...	.....	1	0.14
Total	40	4.49	22	5.77	45	7.20	34	4.90

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM E, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Punched	1	0.11	...	.....	2	0.32	...	.....
Alma Scored	...	.....	1	0.26	6	0.96	3	0.43
Incised Corrugated	2	0.22	1	0.26	...	.....	3	0.43
Tularosa Patterned Corrugated	60	6.74	2	0.52	2	0.32	1	0.14
Tularosa Patterned Corrugated, smudged interior	...	.....	2	0.52	...	.....	1	0.14
Plain Corrugated	90	10.11	50	13.09	53	8.48	59	8.51
Plain Corrugated, smudged interior	5	0.56	4	1.05	3	0.48	36	5.19
Plain and Indented Corrugated	24	2.70	8	2.09	12	1.92	3	0.43
Plain and Indented Corrugated, smudged interior	...	.....	...	.....	1	0.16	12	1.73
Punched Corrugated	1	0.11	...	.....	...	.....	...	.....
Reserve Indented Corrugated	163	18.31	58	15.18	17	2.72	62	8.95
Indented Corrugated, smudged interior	27	3.03	2	0.52	8	1.28	18	2.60
Red Indented Corrugated	1	0.11	...	.....	...	.....	...	.....
Tularosa Fillet Rim	31	3.48	4	1.05	8	1.28	7	1.01
Alma Knobby	...	.....	1	0.26	...	.....	...	.....
Total	405	45.48	133	34.80	112	17.92	205	29.56
Grand Total	890	99.97	382	99.99	625	100.00	693	99.97

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM F, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2	
	No.	%	No.	%	No.	%
Alma Plain	151	34.95	89	50.00	66	39.52
Alma Rough	1	0.23	...	.....	...	.....
San Francisco Red	6	1.39	1	0.56	...	.....
Reserve Smudged	77	17.82	26	14.61	44	26.35
Total	235	54.39	116	65.17	110	65.87
Reserve B/W	27	6.25	2	1.12	17	10.18
Smudged Decorated	1	0.23	1	0.56	...	.....
Tularosa B/W	...	.....	2	1.12	...	.....
Total	28	6.48	5	2.80	17	10.18
Kiatuthlanna B/W	1	0.23	...	.....	...	.....
Mimbres Bold Face B/W	7	1.62	7	3.93	...	.....
Puerco B/R	...	.....	...	.....	2	1.20
Red Mesa B/W	2	0.46	2	1.12	...	.....
Wingate B/R	1	0.23	1	0.56	...	.....
Indeterminate B/W	4	0.93	7	3.93	3	1.80
Total	15	3.47	17	9.54	5	3.00

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM F, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2	
	No.	%	No.	%	No.	%
Incised Corrugated	...	.....	2	1.12	...	.....
Incised Corrugated, smudged interior	...	.....	1	0.56	...	.....
Tularosa Patterned Corrugated	18	4.17	6	3.37	...	.....
Plain Corrugated	81	18.75	24	13.48	16	9.58
Plain Corrugated, smudged interior	1	0.23	1	0.56	2	1.20
Plain and Indented Corrugated	4	0.93	1	0.56	3	1.80
Plain and Indented Corrugated, smudged interior	1	0.23	1	0.56	...	.....
Reserve Indented Corrugated	41	9.49	4	2.25	11	6.59
Tularosa Fillet Rim	8	1.85	...	.....	3	1.80
Total	154	35.65	40	22.46	35	20.97
Grand Total	432	99.99	178	99.97	167	100.02

ROOM G, HIGGINS FLAT PUEBLO

	Fill		Floor 2		Floor 3	
	No.	%	No.	%	No.	%
Alma Plain	50	14.93	16	4.35	266	34.86
San Francisco Red	8	2.39	...	.....	6	0.79
San Francisco Red, smudged interior	12	3.58	...	.....	...	.....
Reserve Smudged	68	20.30	90	24.46	163	21.36
Total	138	41.20	106	28.81	435	57.01
Reserve B/W	16	4.78	7	1.90	41	5.37
Smudged Decorated	...	.....	1	0.27	8	1.05
St. Johns Polychrome	1	0.30	...	.....	...	.....
Tularosa B/W	7	2.09	32	8.70	10	1.31
Tularosa W/R	1	0.30	...	.....	...	.....
Total	25	7.47	40	10.87	59	7.73

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM G, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 2		Floor 3	
	No.	%	No.	%	No.	%
Kiatuthlanna B/W	...	.....	...	.....	2	0.26
Mimbres Bold Face B/W	1	0.30	...	.....	6	0.79
Puerco B/R	...	.....	1	0.27	6	0.79
Red Mesa B/W	1	0.30	...	.....	13	1.70
Indeterminate B/W	4	1.19	8	2.17	14	1.83
Total	6	1.79	9	2.44	41	5.37
Alma Punched	...	.....	1	0.27	1	0.13
Incised Corrugated	...	.....	...	.....	3	0.39
Tularosa Patterned Corrugated	8	2.39	2	0.54	1	0.13
Plain Corrugated	56	16.72	11	2.98	115	15.07
Plain Corrugated, smudged interior	6	1.79	3	0.82	14	1.83
Plain and Indented Corrugated	1	0.30	2	0.54	8	1.05
Plain and Indented Corrugated, smudged interior	...	.....	...	.....	1	0.13
Reserve Indented Corrugated	69	20.60	168	45.65	62	8.13
Indented Corrugated, smudged interior	3	0.90	5	1.36	13	1.70
Red Indented Corrugated	...	.....	1	0.27	...	.....
Tularosa Fillet Rim	23	6.87	20	5.43	10	1.31
Total	166	49.57	213	57.87	228	29.87
Grand Total	335	100.03	368	99.99	763	99.98

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM H, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	68	37.78	41	28.87	50	13.77	42	25.30
San Francisco Red	11	6.11	1	0.70	1	0.28	...	.....
Reserve Smudged	35	19.44	32	22.54	42	11.57	54	32.53
Total	114	63.33	74	52.11	93	25.62	96	57.83
Reserve B/W	3	1.67	1	0.70	2	0.55	11	6.63
St. Johns Polychrome	...	.....	1	0.70	...	.....	...	.....
Three Circle R/W	1	0.56	6	4.23	...	.....	...	.....
Tularosa B/W	...	.....	...	.....	4	1.10	...	.....
Tularosa W/R	...	.....	...	.....	1	0.28	...	.....
Total	4	2.23	8	5.63	7	1.93	11	6.63

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM H, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Kiatuthlanna B/W	1	0.56	...	.....	...	.....	...	.....
Mimbres Bold Face B/W	1	0.56	...	.....	...	.....	2	1.20
Red Mesa B/W	1	0.56	...	.....	...	.....	1	0.60
Wingate B/R	...	.....	...	.....	1	0.28	...	.....
Indeterminate B/W	5	2.78	2	1.41	3	0.83	2	1.20
Total	8	4.46	2	1.41	4	1.11	5	3.00
Alma Incised	...	.....	1	0.70	...	.....	...	.....
Incised Corrugated	...	.....	...	.....	1	0.28	3	1.81
Tularosa Patterned Corrugated	3	1.67	...	.....	...	.....	2	1.20
Tularosa Patterned Corrugated, smudged interior	1	0.56	8	5.63	...	.....	1	0.60
Plain Corrugated	15	8.33	19	13.38	7	1.93	24	14.46
Plain Corrugated, smudged interior	1	0.56	...	.....	...	.....	2	1.20
Plain and Indented Corrugated	4	2.22	...	.....	...	.....	...	.....
Reserve Indented Corrugated	22	12.22	18	12.68	232	63.91	13	7.83
Indented Corrugated, smudged interior	4	2.22	...	.....	5	1.38	6	3.61
Three Circle Neck Corrugated	...	.....	...	.....	1	0.28	...	.....
Tularosa Fillet Rim	4	2.22	12	8.45	13	3.58	3	1.81
Total	54	30.00	58	40.84	259	71.36	54	32.52
Grand Total	180	100.02	142	99.99	363	100.02	166	99.98

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM I, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	72	24.83	11	14.47	207	17.72	113	33.94
San Francisco Red	3	1.04	...	.....	3	0.26	...	.....
Reserve Smudged	60	20.69	7	9.21	231	19.78	63	18.92
Total	135	46.56	18	23.68	441	37.76	176	52.86
Reserve B/W	19	6.56	2	2.63	67	5.74	18	5.41
Smudged Decorated	1	0.34	3	3.95	17	1.46	8	2.40
Tularosa B/W	7	2.41	...	.....	5	0.43	4	1.20
Total	27	9.31	5	6.58	89	7.63	30	9.01
White Mound B/W	...	.....	...	.....	1	0.09	...	.....
Kiatuthlanna B/W	1	0.34	...	.....	2	0.17	...	.....
Mimbres Bold Face B/W	3	1.04	...	.....	4	0.34	2	0.60
Puerco B/W	2	0.69	...	.....	5	0.43	12	3.60
Red Mesa B/W	1	0.34	...	.....	3	0.26	5	1.50
Wingate B/R	...	.....	...	.....	2	0.17	1	0.30
Indeterminate B/W	2	0.69	1	1.32	13	1.11	3	0.90
Total	9	3.10	1	1.32	30	2.57	23	6.90

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM I, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Incised	...	.....	...	.....	3	0.26	...	.....
Alma Scored	1	0.34	...	.....	...	.....	...	.....
Incised Corrugated	1	0.34	...	.....	1	0.09	3	0.90
Incised Corrugated, smudged interior	1	0.34	...	.....	...	.....	...	.....
Tularosa Patterned Corrugated	5	1.72	1	1.32	5	0.43	3	0.90
Tularosa Patterned Corrugated, smudged interior	...	.....	...	.....	4	0.34	...	.....
Plain Corrugated	34	11.73	7	9.21	139	11.89	61	18.32
Plain Corrugated, smudged interior	2	0.69	3	3.95	42	3.59	4	1.20
Plain and Indented Corrugated	2	0.69	2	2.63	28	2.39	7	2.10
Plain and Indented Corrugated, smudged interior	...	.....	...	.....	10	0.86	1	0.30
Reserve Indented Corrugated	61	21.05	37	48.67	347	29.70	23	6.91
Indented Corrugated, smudged interior	1	0.34	1	1.32	12	1.03	...	.....
Tularosa Fillet Rim	11	3.79	1	1.32	17	1.46	2	0.60
Total	119	41.03	52	68.42	608	52.04	104	31.23
Grand Total	290	100.00	76	100.00	1168	100.00	333	100.00

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM J, HIGGINS FLAT PUEBLO

	Fill		Floor	
	No.	%	No.	%
Alma Plain	13	6.05	19	7.79
San Francisco Red	1	0.47	...	.....
San Francisco Red, smudged interior	...	.....	1	0.41
Reserve Smudged	75	34.88	83	34.02
Total	89	41.40	103	42.22
Reserve B/W	4	1.86	8	3.28
Smudged Decorated	...	.....	2	0.82
Total	4	1.86	10	4.10
Indeterminate	2	0.93	3	1.23
Total	2	0.93	3	1.23
Alma Neck Banded	...	.....	1	0.41
Alma Scored	1	0.47	1	0.41
Incised Corrugated	...	.....	1	0.41
Tularosa Patterned Corrugated	11	5.12	20	8.20
Plain Corrugated	19	8.84	29	11.89
Plain Corrugated, smudged interior	2	0.93	1	0.41
Plain and Indented Corrugated	1	0.47	2	0.82
Reserve Indented Corrugated	63	29.30	51	20.90
Three Circle Neck Corrugated	1	0.47	...	.....
Tularosa Fillet Rim	20	9.30	22	9.02
Plain Corrugated, interior Smudged Decorated	2	0.93	...	.....
Total	120	55.83	128	52.47
Grand Total	215	100.02	244	100.02

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM K, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	22	43.14	17	36.17	6	25.00	59	34.91
San Francisco Red	1	1.96	...	.....	...	.....	2	1.18
Reserve Smudged	5	9.80	9	19.15	9	37.50	22	13.02
Total	28	54.90	26	55.32	15	62.50	83	49.11
Reserve B/W	2	3.92	6	12.77	1	4.17	3	1.78
St. Johns Polychrome	...	.....	...	.....	...	.....	8	4.73
Tularosa W/R	1	1.96	...	.....	...	.....	...	.....
Total	3	5.88	6	12.77	1	4.17	11	6.51
Mimbres Bold Face B/W	...	.....	...	.....	...	.....	2	1.18
Mimbres Classic B/W	1	1.96	...	.....	...	.....	...	.....
Puerco B/W	...	.....	...	.....	...	.....	11	6.51
Wingate B/R	...	.....	...	.....	...	.....	1	0.59
Indeterminate B/W	2	3.92	...	.....	...	.....	4	2.37
Total	3	5.88	...	.....	...	.....	18	10.65

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM K, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Punched	...	.....	2	4.26	...	.....	...	.....
Incised Corrugated	...	.....	...	.....	...	.....	4	2.37
Tularosa Patterned Corrugated	...	.....	...	.....	1	4.17	...	.....
Plain Corrugated	3	5.88	9	19.15	1	4.17	26	15.38
Plain Corrugated, smudged interior	4	7.84	...	.....	2	8.33	...	.....
Plain and Indented Corrugated	...	.....	...	.....	1	4.17	3	1.78
Reserve Indented Corrugated	7	13.73	3	6.38	1	4.17	21	12.43
Indented Corrugated, smudged interior	2	3.92	1	2.13	2	8.33	2	1.18
Tularosa Fillet Rim	1	1.96	...	.....	...	.....	1	0.59
Total	17	33.33	15	31.92	8	33.34	57	33.73
Grand Total	51	99.99	47	100.01	24	100.01	169	100.00

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM L, HIGGINS FLAT PUEBLO[1]

	Fill		Floor 2	
	No.	%	No.	%
Alma Plain	61	28.37	22	21.15
San Francisco Red	2	0.93	...	.....
Reserve Smudged	30	13.95	13	12.50
Total	93	43.25	35	33.65
Reserve B/W	10	4.65	4	3.84
Smudged Decorated	1	0.46	...	.....
Three Circle R/W	1	0.46	...	.....
Total	12	5.57	4	3.84
Mimbres Bold Face B/W	1	0.46	1	0.96
Mimbres Classic B/W	...	.....	1	0.96
Wingate B/R	...	.....	2	1.92
Indeterminate B/W	2	0.93	...	.....
Total	3	1.39	4	3.84

[1] Floor 1 sherds lost.

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM L, HIGGINS FLAT PUEBLO (*continued*)

	Fill		Floor 2	
	No.	%	No.	%
Alma Punched	...	.....	1	0.96
Incised Corrugated	1	0.46	...	.....
Tularosa Patterned Corrugated	5	2.32	...	.....
Tularosa Patterned Corrugated, smudged interior	1	0.46	...	.....
Plain Corrugated	31	14.41	9	8.65
Plain Corrugated, smudged interior	2	0.93	3	2.88
Plain and Indented Corrugated	...	.....	1	0.96
Reserve Indented Corrugated	61	28.37	42	40.38
Indented Corrugated, smudged interior	1	0.46	...	.....
Three Circle Neck Corrugated	2	0.93	...	.....
Tularosa Fillet Rim	3	1.39	5	4.80
Total	107	49.73	61	58.63
Grand Total	215	99.94	104	99.96

TABLE 1.—SHERD ANALYSIS (*continued*)

ROOM M, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2		Floor 3	
	No.	%	No.	%	No.	%	No.	%
Alma Plain	10	52.63	30	30.00	8	20.00	16	42.10
Reserve Smudged	3	15.78	19	19.00	10	25.00	8	21.05
Total	13	68.41	49	49.00	18	45.00	24	63.15
Reserve B/W	1	5.26	2	2.00	5	12.50	2	5.26
Smudged Decorated	1	5.26	1	1.00	1	2.50	...	.....
St. Johns Polychrome	...	.....	...	.....	1	2.50	...	.....
Total	2	10.52	3	3.00	7	17.50	2	5.26
Kiatuthlanna B/W	...	.....	2	2.00	...	.....	...	.....
Mimbres Bold Face B/W	...	.....	1	1.00	...	.....	1	2.63
Puerco B/W	...	.....	1	1.00	...	.....	...	.....
Wingate B/R	...	.....	1	1.00	...	.....	1	2.63
Indeterminate B/W	1	5.26	4	4.00	1	2.50	...	.....
Total	1	5.26	9	9.00	1	2.50	2	5.26
Plain Corrugated	3	15.78	11	11.00	6	15.00	...	.....
Plain Corrugated, smudged interior	...	.....	...	.....	2	5.00	...	.....
Plain and Indented Corrugated	...	.....	2	2.00	...	.....	...	.....
Reserve Indented Corrugated	...	.....	21	21.00	4	10.00	7	18.41
Indented Corrugated, smudged interior	...	.....	2	2.00	...	.....	2	5.26
Tularosa Fillet Rim	...	.....	3	3.00	2	5.00	1	2.63
Total	3	15.78	39	39.00	14	35.00	10	26.30
Grand Total	19	99.97	100	100.00	40	100.00	38	99.97

TABLE 1.—SHERD ANALYSIS (*concluded*)

ROOM N, HIGGINS FLAT PUEBLO

	Fill		Floor 1		Floor 2	
	No.	%	No.	%	No.	%
Alma Plain	27	26.21	...	.....	20	34.48
San Francisco Red	5	4.85	...	.....	1	1.72
Reserve Smudged	19	18.44	...	.....	14	24.13
Total	51	49.50	...	.....	35	60.33
Reserve B/W	1	0.97	...	.....	...	.....
Smudged Decorated	1	0.97	...	.....	...	.....
St. Johns Polychrome	3	2.91	...	.....	...	.....
St. Johns Polychrome Sub-glaze	8	7.76	...	.....	...	.....
Tularosa B/W	13	12.62	...	.....	...	.....
Total	26	25.23	...	.....	...	.....
Red Mesa B/W	...	.....	...	.....	2	3.44
Indeterminate	1	0.97	...	.....	...	.....
Total	1	0.97	...	.....	2	3.44
Plain Corrugated	5	4.85	...	.....	6	10.34
Plain Corrugated, smudged interior	...	.....	...	.....	1	1.72
Reserve Indented Corrugated	15	14.56	77	100.00	14	24.13
Red Indented Corrugated	2	1.94	...	.....	...	.....
Tularosa Fillet Rim	3	2.91	...	.....	...	.....
Total	25	24.26	77	100.00	21	36.19
Grand Total	103	99.96	77	100.00	58	99.96

VI. The Plant Remains

By HUGH C. CUTLER

Open sites are always a challenge because perishable material is rarely preserved and it is difficult to determine exactly what kinds of foods supported the occupants. Occasionally some of the plant remains are preserved by charring or, more rarely, recorded as impressions in clay pot stoppers and in mortar. Fortunately, there was a considerable amount of charred material in the Higgins Flat Pueblo, especially in Room C, and we can reconstruct quite clearly the food habits of the people who occupied the site and can even identify the directions from which some of the cultivated plant forms were introduced.

CORN (*Zea mays*)

The greatest bulk of the material is corn, all charred, in the form of grain, cobs, or complete ears, sometimes with remnants of the husks still intact. Corn has been linked with man in the Americas for a long time and readily studied characters in the ear and tassel differ enough so we can distinguish the many kinds which are known. In recent years so much progress has been made in the study of corn that it is difficult even for those working constantly with corn to keep up with the new developments. Some of the methods developed for differentiating the various kinds are excellent but require specialized knowledge, skills and time to apply them, and often the methods can be used only on exceptionally well-preserved material. For many years I have tried to devise methods which could be applied to the most common corn remains, cobs or cob fragments devoid of grains, and loose grains. A practical check on the new methods has been the excellent sequence of abundant and well-preserved material excavated at Tularosa Cave (Martin and others, 1952). So far the simplest method for comparing Southwestern corn specimens has been to graph the number of rows of grains and the thickness of the grains. Both of these figures can be obtained from loose grains, naked cobs, or from ears with the grains. Charred, parched, dry, or

fresh (but mature) specimens can be used and the cobs can be broken in small pieces or left entire.

Thickness of the grains can be readily calculated on the cob by measuring the total length of the space formerly occupied by 5 or 10 of the grains and dividing by the proper number. From dry grains one can usually obtain a quite accurate figure of thickness if the grain is mature and dried naturally. If the grain is parched, it usually expands, especially in thickness. Careful inspection will usually show if the grain was parched, as was much of the stored grain and even the beans in the Southwest. If the parching was done slowly, as indicated by a quite firm interior of the grain and no burned or charred spots on the surface, the change in grain thickness is relatively slight. Grains are greatly distorted when heated rapidly, especially if the grains were moist when the heat was applied and the grains were separated or isolated enough to have room to expand. Grains on ears which have been burned usually were so tightly packed on the ear that they only expanded in length, and thickness is not changed appreciably. Usually most of the kernels in masses of grains, especially when these were protected by mats, baskets or earthenware containers, were not subjected to sudden heat and thus experienced little change in size. Small lots of corn grains which were heated quickly, especially those in which the grains were moist, can be identified as distorted in size because the mass is stuck together with a gummy exudate which hardens and holds the grains together. Grains which originally were only 5 mm. thick can swell to as much as 8 mm., more than half again the original thickness, but the fact that the grain has changed is quite obvious. In the case of the loose grains in Room C, it was estimated that the grains had swelled only about half a millimeter in thickness and the corrected figures agree quite well with those made on cobs and on grains on tightly packed ears (fig. 81).

Kernel thickness in itself is not a very significant measurement and it would be far better to use the ratio of width to thickness. Usually grains of the Pima-Papago race of corn (Anderson and Cutler, 1942) are relatively thick in proportion to their width while grains from the Keresan Pueblos are relatively thin in proportion to their width. Tanoan corn approaches that of the Hopi while that of the Hopi has many similarities to Papago corn and some of the varieties the Hopi grow are to be considered closer to the Pima-Papago race than the Pueblo race. When specimens consist largely of cobs without grains or of charred masses of ears which one wants to preserve nearly intact, it is difficult to obtain large numbers of

FIG. 81. A comparison of some Southwestern corn. Letters on this chart indicate the rooms of Higgins Flat Pueblo from which the corn came. Each letter and subscript indicate a particular lot of corn listed in the summary of corn remains (p. 179); thus, C_1 is the first lot from Room C.

Cliff Palace. Pueblo III corn in the Mesa Verde National Park Museum.

Falls Creek. Basketmaker II corn in the Mesa Verde National Park Museum.

Georgetown. From Level 6, Square 3R2, of Tularosa Cave, a Georgetown Phase level.

Hopi Blue. Hopi blue corn reported by Brown, Anderson, and Tuchawena (1952).

Hopi Sweet. Hopi sweet corn collected in 1953.

Kokoma. Hopi dye corn reported by Brown, Anderson and Tuchawena (1952).

Mohave. The common white flour corn of older Mohaves.

Papago. The common cream-colored flour corn of the Papagos.

Pine Lawn. From Level 9, Square 3R2, of Tularosa Cave, a Pine Lawn Phase level.

Pre-Pottery. From Level 11 pits, Square 3R2, of Tularosa Cave, a pre-pottery level.

San Francisco. From Level 4, Square 3R2, of Tularosa Cave, a San Francisco Phase level.

Santa Clara. Blue flour corn grown at Santa Clara Pueblo.

Siles. Blue flour corn grown by an old Spanish family near Cochiti Pueblo.

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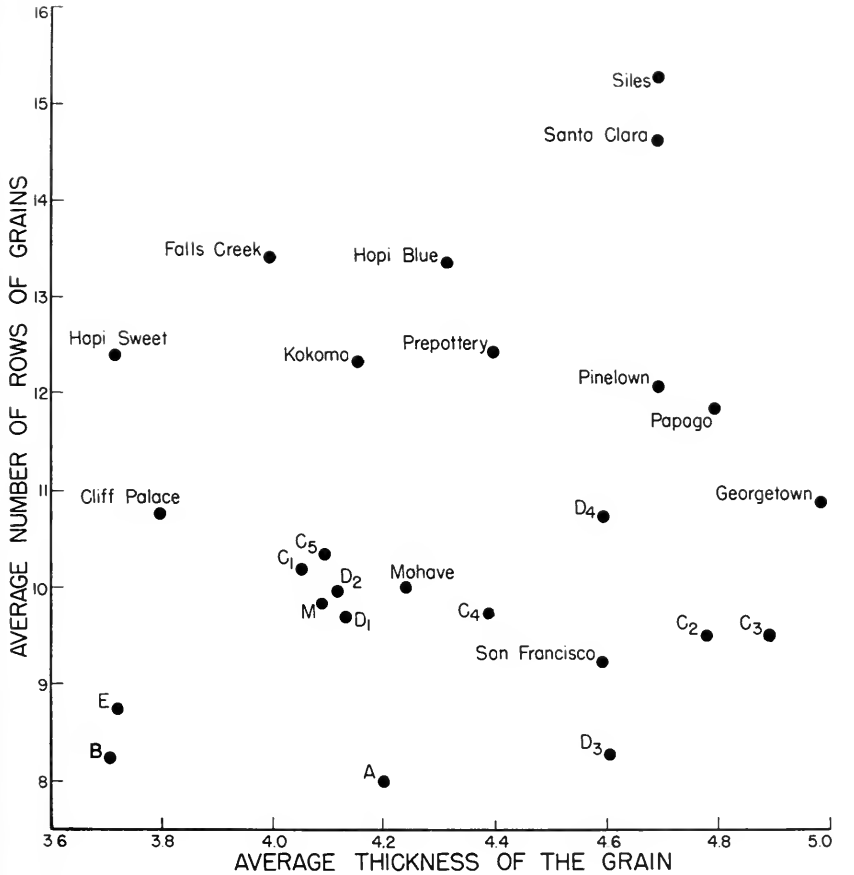
figures for kernel width, so the thickness measurement is used alone here.

To measure row number on the cob one should remember that grains of corn are practically always borne in pairs on the cob. The grains in any row of pairs are not exactly at the side of the pairs in the neighboring rows of paired grains but are higher or lower by the amount of half the thickness of a grain. Thus *A* and *a* in figure 82, left, are a pair, while *B* and *b* are an adjacent pair. A view of the grains from above as seen in figure 82, left, thus shows them with five sides. Each pair of grains is borne on the margin of a small pocket in the cob which is not visible unless the cob is partially cut away by rough treatment or burning away the chaff and glumes which surround the grain. These pockets have sometimes been confused with the remains of rows of grains and in the literature there are occasional records of ears with five rows of grains when in reality these were ears with five rows of pairs of grains or ten rows of grains.

To measure row number from a single grain it is only necessary to remember that the total number of rows of grains on an ear covers 360 degrees, so that on an eight-rowed ear, each grain occupies 45 degrees, one-eighth of the complete circle. Since the grains in adjacent pairs of rows are not side by side, the angle on the side where the pairs meet must be measured as shown in figure 82, right.



The scale shown can be utilized to obtain the radius of the cob (*rc*) or the radius of the ear (*re*) complete with grains.

In the Higgins Flat region the number of rows of grains was high in the past and became lower until A.D. 1200. Several reasons are advanced for the gradual decrease in row number. The large number of aborted and undeveloped rows of grains in ears from early levels of Tularosa Cave suggests that conditions were marginal for much of the corn, perhaps because the corn was planted in poor soil, lacked water, or had to compete with weeds or with cultivated plants in the same field. Some corn varieties with low row numbers seem to have a survival value under difficult conditions and there may have been a gradual natural selection for such kinds. However, the sudden drop in number of rows of grains which occurs in the

Tularosa Cave corn (Martin and others, 1952) immediately after the Georgetown Phase suggests that this change reflects the introduction of new kinds of corn, probably from the north, because the new row numbers are accompanied by an increase in the size of the shank and cob and by harder cobs, all characters found earlier and more often to the north. These, and several other characters,

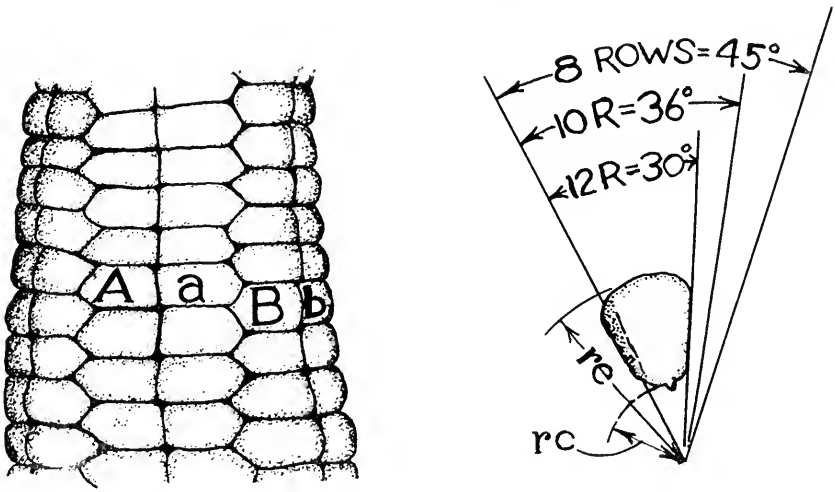


FIG. 82. Drawing showing arrangement of corn grains on cob and methods of measurement of corn. Left: *A* and *a* are a pair of grains borne in a single pocket on the cob. *B* and *b* are an adjacent pair of grains. Right: A method for measuring the number of rows of grain on an ear, the radius of the cob (*rc*), and the radius of the complete ear (*re*) from a single kernel of corn.

give the Higgins Flat corn some similarity to the Pueblo III corn of Mesa Verde, a Pueblo type of corn, but the Higgins Flat corn is mostly like that which the Pima and Mohave Indians grew until a few years ago. Its characters, even to the tapered base of the ears and the striations on the grains which result from the wrapping of the husks, are mainly those found in the Pima-Papago race.

The diversity of the corn is greater than that of the upper levels of Tularosa Cave (about A.D. 1200). Most of the ears have large grains and a relatively low row number, although there are some ears with as many as 20 rows of grains. A few ears have many rows of small popcorn-like kernels, and some cobs resemble those found in the earliest levels of Tularosa Cave. Most of the corn probably was flour corn but some grains may have been flint. There is no sign of dent or sweet corn.

A Summary of the Corn

On the chart the corn is designated by the letter of the room in which it was found and by a number indicating each particular lot as listed below. Only the corn which actually was measured is listed. Where only a few fragments were found, these were measured to see if they conformed to the general picture but were not charted, while from Room C only a random sample taken from the thousands of grains was measured carefully, although the entire lot was inspected in a search for unusual types. All corn material was charred.

Room A: Four cob fragments, average row number 8, grain thickness 4.2 mm.

Room B: Twelve cob fragments, average row number 8.3, grain thickness 3.7 mm.

Room C: Lot 1. Sixty grains from the floor of the southwest corner, average row number 10.4, grain thickness 4.6 mm.

Lot 2. 143 grains scattered about on a burned mat on the occupational level of the southeast quadrant, rows 9.57, thickness 5.29 mm.

Lot 3. Fifty grains from the northeast corner above the floor, rows 9.6, thickness 5.4 mm.

Lot 4. 228 grains from the occupational level of the northwest quadrant, rows 9.79, thickness 4.89 mm. From the thickness of the loose grains in lots 1 through 4 of Room C, 0.5 mm. was subtracted in the chart to compensate for an estimated amount of swelling caused by heating.

Lot 5. Thirteen ears from the floor of the southwest corner, rows 10.3, thickness 4.06 mm. The ears were piled at random when burned, not stacked in rows. Some ears had husks.

Room D: Lot 1. Six cob fragments from the east wall fill, average row number 9.7, average thickness of grain 4.15 mm.

Lot 2. Ten cob fragments from the fill of the northwest quadrant, rows 10, thickness 4.06 mm.

Lot 3. Twelve cobs from the lower floor just north of the tunnel, rows 8.3, thickness 4.61 mm.

Lot 4. Four corn ears with remnants of husks from floor of southeast quadrant, average number of rows 10.8, average grain thickness 4.6 mm.

Room E: Five cobs with average number of rows 8.8, average grain thickness 3.72 mm.

Room M: A large quantity of corn, some of it stacked in neat cordwood type piles while some of it was scattered or heaped at the time it was burned. Many of the ears had been stored within the inner three or four husk leaves. There is no consistent difference between the husk covered and the husked ears. Average measurements for 14 ears, number of rows 9.9, thickness of grains 4.1 mm.

BEANS

Among the scattered corn kernels in Room C there were some beans, very few in comparison to the number of corn grains and

probably representing an accidental mixing, not a scattering from a broken container. Also found mixed with the corn grains in the same place were two kinds of beans, three kinds of *Cucurbita* seeds, bottle gourd seeds, cotton seeds, some walnuts, juniper berries, and charcoal fragments. Both the common, or kidney, bean (*Phaseolus vulgaris*) and the tepary bean (*P. acutifolius* var. *latifolius*) were found and one bean fragment was so large that it may have been part of a lima bean (*P. lunatus*), a scarlet runner bean (*P. multiflorus*), or even a jack bean (*Canavalia ensiformis*), all three of which are known from relatively late sites in central and southern Arizona. The common beans were similar to those from Tularosa and Cordova Caves and to types still grown by the Papagos and Pimas and Hopis. The teparies are similar in size and shape to those recovered at Snaketown by Gladwin (specimens in the Arizona State Museum).

SQUASH AND GOURDS

At least three species of the genus *Cucurbita* were grown at Higgins Flat. Most abundant are the seeds of the *Cucurbita pepo*, the squash found in Tularosa Cave from the earliest pre-pottery levels right up to the most recent occupation and the kind still grown by many Indians in the Southwest. The seeds averaged about 12 mm. in length and 6 mm. in width. A second species, *C. mixta* Pangalo, is not so common in the Southwest. The size and the furrows on the corky face of the few seeds found at Higgins Flat identify the variety as one still grown on the Hopi mesas and at Taos Pueblo for food and for the hard shell which serves as a container and occasionally as a resonator for a sort of musical instrument. This variety is frequently grown under the name of green striped cushaw. The greatest diversity in the *Cucurbita mixta* varieties is to be found in central Mexico. After about A.D. 1200 the species is found in many parts of the San Juan River basin and a relatively few specimens are known from pre-Conquest periods in other parts of the Southwest, for example, from Tonto Ruin, Ventana Cave, and a room excavated in 1953 at Point of Pines. It is likely that the *C. mixta* in most of these sites came from the north, although, like the large-shanked corn ears, the original source of both of these plants must have been far to the south. In Room C there were a few seeds and one small fragment of the rind of a wild gourd, *C. foetidissima*, and two seeds of the cultivated white-flowered bottle gourd (*Lagenaria siceraria*). The bottle gourd seeds are similar to those found throughout the Southwest, with

firm, hard margins. The paucity of remains of bottle gourds, which require fairly good conditions for growth, suggests that the conditions for farming were marginal. Most varieties of the bottle gourd prefer quite good soils and a fairly long season to mature large solid fruits.

COTTON

Several cotton seeds were found mixed with the corn grains in Room C. All the seeds were quite uniform (8 mm. long, 5 mm. diameter) and compare favorably with seeds of cotton from northern Mexico in size.

WILD PLANT REMAINS

Juniper (*Juniperus utahensis*)

About 60 berries in Room C, on floor of northeast quadrant, and scattered in other parts of this room and occasionally found in other rooms.

Common Reed (*Phragmites communis*)

Fragments of stem at north wall of Room C, in the northwest quadrant of Room M, Floor 2, and at the south wall of Room A.

Sotol (*Dasylirion wheeleri*)

Charred pieces of a mat made from split leaves, found under heaped corn ears at the north wall of Room C.

Yucca (*Yucca baccata*)

A single charred seed in the northwest quadrant of Room C.

Walnut (*Juglans major*)

About 100 nuts, perhaps from a basket, in the northeast quadrant of Room C; about 26 nuts in the southeast quadrant of Room C; and occasional nuts in other parts of the site.

Pigweed (*Chenopodium fremontii*)

About 200 seeds in dirt from the southwest quadrant of Floor 2 of Room E.

Saltbush (*Atriplex canescens*)

A single seed from the southwest quadrant, Floor 2, of Room E.

Seepweed (*Suaeda suffrutescens*)

Three seeds from the southwest quadrant, Floor 2, Room E. There are six seeds, representing two species, which have not been identified.

Stickleaf (*Mentzelia albicaulis*)

Five seeds recovered from among the dirt about loose corn on the occupational level, northeast quadrant, Room C. Undoubtedly some were missed for the grains are minute and so charred that they break readily. These five were recovered by throwing some of the screened dirt in a bucket of water and skimming off the floating charcoal particles for inspection.

Cactus (*Opuntia* sp.)

Numerous terminal young joints of *Opuntia* were found in Room C.

Datura, Jimson Weed (*Datura meteloides*)

The only seeds found were a lot of about 900 on Floor 2 of the southwest quadrant of Room E. Datura seeds and roots were and still are used by the Indians of the Southwest to induce visions, as medicine for miscarriage, to cure meanness, and for varied related purposes.

Wild Gourd (*Cucurbita foetidissima*)

A fragment of rind about 1.5 mm. square and two seeds are the only evidence of this wild gourd in the Higgins Flat site. It was one of the most common wild plants found in Tularosa and Cordova Caves. It is a weed, usually growing only in abandoned fields, on the margins of cultivated ones, or on disturbed soil. It is used occasionally in washing and the seeds are roasted and eaten.

CONCLUSIONS

From the plant remains of the Higgins Flat site it is apparent that the inhabitants were primarily agriculturists and ones with considerable skill. The corn is good; the grains are plump and large, there are few aborted rows of kernels, and they grew several different kinds, although it was not possible to determine just how many kinds they did grow. They had at least two kinds of beans, two cultivated squashes, and the bottle gourd. There is a fair

variety of wild seeds (the fact that some of those which were recovered were less than a millimeter in diameter speaks well for the methods of archaeology), some of them from plants which would also yield edible greens unlikely to be preserved. The total bulk of gathered foods is relatively small in comparison to the corn.

While the corn and the *Cucurbita mixta* squash suggest some effective contact with the north, the tepary beans, the cotton and the majority of characters of the corn show the influence of the areas to the south and west. An assemblage of similar plants could have been recovered from the Papago, the Pima and the Mohave of a few years ago. Some of the varieties grown by the Hopi, Zuñi and Tanoan Pueblos are similar in some respects to those excavated at Higgins Flat.

A large number of datura seeds were found in the southwest quadrant of Room E. It is interesting that these seeds, used today by Indians of the Southwest for religious and medicinal purposes, occurred in a room that yielded ceremonial objects.

VII. The Burials at Higgins Flat Pueblo

By JOHN B. RINALDO

Fifteen burials, including two adults, two children 6 and 12 years of age, and eleven infants (see fig. 83) were uncovered at Higgins Flat Pueblo during the 1953 season. They were all found below the floors of rooms. No burials in extended position were found; all were either semi-flexed or flexed, and the favored position of orientation appears to have been with the head to the south. One other flexed burial had been uncovered (possibly by some curio hunters) in an area southeast of the pueblo adjacent to Trench II; also, when the site was first visited in 1947 there were human bones found in and around a pit outside the pueblo not far from Room A. No other burials were found in the rather intensive trenching outside the pueblo, although one human radius was found in Trench I. Therefore it seems probable that most of the burials at this site were made beneath the floors of dwelling rooms rather than in a cemetery outside the pueblo as was done a few miles up the San Francisco River (Hough, 1907, pp. 66–67).

Five of the burials were covered with twill plaited mats of bear grass (see section on *Textiles*, pp. 129–136), and three with some sort of cloth fabrics in addition. One appeared to have been covered with an animal hide. Six were accompanied by pottery vessels (fig. 84) usually consisting of a small narrow-mouthed jar and one or more bowls with smudged interior (see chapter on *Pottery*, pp. 137–173). Three wore shell beads and/or a bracelet. Six were without associated objects, but two of these consisted of a very few scattered bones and perhaps should not be considered as intentional burials.

The Indians continued to occupy the rooms after the burials had been made. In most instances the interments occurred in the loose fill between the floors, or in shallow pits in the sterile soil just below the lowest floors. However, in either case the bodies had been covered with loose soil and then another occupation floor of plaster built over them.

BURIAL NO.	LOCATION	POSITION	AGE	ASSOCIATED ARTIFACTS
1	Room B, south half below floor 1	Skull only	Infant	None
2	Room B, southeast quadrant on floor 2	Flexed Head to south	Infant	Smudged interior bowl sherds
3	Room A, south wall below floor 1	Semi-flexed Head to west	Infant	Textile over body
4	Room B, south half below floor 1	Flexed Head to south	Infant	None
5	Room A, south half below floor 1	Flexed Head to south	Infant	None
6	Room B, northeast quadrant below floor 1	Flexed, sitting Head between knees	Infant	None
7	Room A, southwest corner below floor 1	Semi-flexed Head to south	Infant	Plaited mat cover Shell beads Smudged int. bowl Small jar
8	Room A, southwest corner pit below floor 2	Semi-flexed on back Head to south	Adult	Plaited mat cover Cloth over face 3 smudged int. bowls Small jar
9	Room A, southwest corner below floor 1	Semi-flexed Head to south	Infant	Plaited mat cover Textile over body 2 smudged int. bowls Small jar
10	Room A, northwest quadrant pit under west wall	Semi-flexed Head to north	Adult	Fur cover ? 2 smudged int. bowls
11	Room A, northwest quadrant below floor 2	?	Infant	None
12	Room C, northwest corner below floor	?	Child	None
E-1	Room E, southeast corner below floor 1	Flexed Head to north	Infant	Shell necklace Shell bracelet Small jar
H-1	Room H, southeast corner pit under floor 3	Semi-flexed on back Head to south	Child	Plaited mat cover Smudged int. bowl Small jar
N-1	Room N, northwest corner floor 2 below floor 1	Semi-flexed on back Head to west	Infant	Plaited mat cover

FIG. 83. Tabulation of burial data.

FIG. 84. Adolescent burial from pit below Floor 3, Room H; 30 cm. arrow points north.

FIG. 85. Infant burial from below Floor 1, Room A; 30 cm. arrow points north.

On the whole, the infant burials (fig. 85) were better preserved than the adult burials. All of the skeletal material was excavated and brought back to the Museum for study. However, none of the skulls were recovered intact due to the extreme state of decomposition of the adult skulls and the extremely fragile nature of the infant skulls. Furthermore, because only two of the series are of adults, the series seems to be of little value to any future study of the physical type of the prehistoric population of the area.

VIII. Summary and Synthesis

By Paul S. Martin

SUMMARY

During the summer of 1953, we excavated 14 rooms in a pueblo site called Higgins Flat Pueblo. The building was erected and occupied during the Tularosa Phase and was abandoned probably about the year A.D. 1250. During the time this village was occupied —a span of perhaps 50–75 years—the people spent a fair amount of energy in making architectural changes, such as additions and renovations. This restlessness and the urge to change may be manifestations of psychological frustrations and worry; or the alterations may be the result of diverting thwarted drives or ambitions or of channeling latent feelings of hostility toward one another. Perhaps frictions and tensions developed as the village increased in size by increment of nearby family units. Or, perhaps, this "architectural neurosis" (!) may be partly the result of the peaceful merging of the Mogollon and Anasazi Indians. That there was a blending of the two traditions and that the two peoples lived peacefully side by side in this village are suggested by our evidence, especially that from ceramics. Although I wish to emphasize "peaceful," I should also like to point out that there may have been strains, irritations, and bickering. Tensions might have been in part dissipated, if the energies of the people had been utilized in building. Remodeling may have been due to other causes—population growth or burial customs.

Analysis of the pottery demonstrates that about 90 per cent of the pottery from Higgins Flat Pueblo may be assigned to the Mogollon Brown Ware. In the earlier levels in the rooms and in the trash heaps we have observed that the Reserve Black-on-White and Mimbres Bold Face Black-on-White pottery types often occur in about the same frequency. This association had been sensed in our other digs in previous seasons, but the actual number of sherds involved was too small to make much of the point. The association in

this site, however, is clear and strong and we therefore point it out. From this association (and from other evidence) we infer that Anasazi people lived peacefully side by side at the Higgins Flat Pueblo with people possessing the Mogollon traditions.

Smudging, a Mogollon invention (Haury, 1940, p. 87), first appeared during the San Francisco Phase. Smudged pottery—Reserve Smudged, Tularosa Fillet Rim, and Smudged Textured types—all increase from that time through to the end of the Mogollon occupation in the Reserve area.

Fifteen burials were discovered. All of these interments had been made beneath the floors of rooms. In some instances, a shallow pit had been dug in a floor and the burial along with mortuary pottery was laid therein, covered with dirt, and the floor smoothed over; in other instances, the body and the mortuary pottery had been laid out on a floor, after which 20 to 35 cm. of fill was scattered evenly over the burial and the original floor. Thus a new and higher floor level was created.

Thirty-two fragments of cordage and textile specimens were recovered from the excavations at Higgins Flat Pueblo. All of them confirm Miss Bluhm's previous conclusions as to their presence during the Tularosa Phase in the Pine Lawn-Reserve area. The textile fragments from the Tularosa Phase of Higgins Flat resemble those found in the Anasazi area of the same time period; and this resemblance is stronger in the collection from Higgins Flat Pueblo than it is in those from the earlier phases of Tularosa and Cordova Caves. Here, again, is a suggestion that we have a southward movement of Anasazi traits and people and a peaceful merging of Anasazi with Mogollon peoples, as reflected in architecture and to some degree in pottery and other traits.

Miss Bluhm also suggests, on the basis of an extended comparative study, that throughout the Southwest after A.D. 1000 all textiles, cordage and sandals showed more numerous points of resemblance.

Dr. Cutler, formerly Curator of Economic Botany at this Museum and now Curator of the Museum, Missouri Botanical Garden, analyzed the plant remains from Higgins Flat Pueblo. His chapter, from which I draw the following statements, is included in this report.

Dr. Cutler states that the Indians of the pueblo were skillful farmers who grew several kinds of corn, some of the characters of which are similar to Pueblo III corn of the Mesa Verde, but most of

which are like those found in the corn grown by the Pima and Mohave Indians up to a few years ago. The Higgins Flat farmers also cultivated at least two kinds of beans—the tepary and the kidney bean—two cultivated squashes and the bottle gourd, and cotton. Although some of the characters of the corn and the *Cucurbita mixta* suggest contact or influences from the Anasazi area, the tepary beans, the cotton, and the majority of characters of the corn show the influence of areas to the south and the west (Hohokam and Salado?).

Dr. Cutler's conclusions, independently arrived at, are especially interesting because they agree with our observations and conclusions concerning the ceramic, lithic, and shell artifacts.

From chapter III on *Artifacts* by Rinaldo the following facts may be summarized.

The majority of manos were worked on all faces and edges so as to produce tools that were symmetrical and rectangular.

Most rubbing stones (one-handed manos with range in length from 10 cm. to 25 cm.) were not worked and were oval or irregular in outline. Many manos were of the beveled type and occur most frequently in the upper levels of the fill or on the latest floors. Since this type occurs primarily in the latest parts of the pueblo, it is probable that it may be a marker of a late horizon.

The ratio of rubbing stones to manos is significantly lower in the Tularosa Phase (one rubbing stone to ten manos) than in the Pine Lawn Phase (one rubbing stone to two manos).

Mortars and pestles as well as polishing stones have decreased markedly in frequency and have practically disappeared from the scene by Tularosa times.

Metates were apparently broken intentionally.

Trough metates, open at both ends (sometimes called through trough metates) are the most common type at Higgins Flat Pueblo and represent the latest type.

The metates in bins are always of the slab type.

The proportion of manos to metates in Higgins Flat Pueblo was seven manos to one metate; and at the SU Site (Pine Lawn Phase), two manos to one metate. In late times the manos were carefully shaped, whereas in earlier phases the manos were shaped through use rather than by intentional working. Just why there were more manos for each metate in late times is not known. Perhaps more people used one metate or perhaps grinding habits changed. It is

also possible that the women desired to refine the flour and used several grades of manos.

Stone slabs decorated with painted designs and painted mortars occurred at Higgins Flat Pueblo and are similar to those found distributed in western and southern pueblos.

The paint palettes bear a resemblance to Hohokam paint palettes.

Corn mounds and full grooved axes were recovered and are designated as Anasazi traits or of Anasazi origin.

The three quarters grooved axes may be Hohokam in origin.

Animal effigies, the "sun" disc, and the tubular tobacco pipe, of stone and all gayly painted, may have been used in curative rituals of the medicinal societies and resemble objects associated with Hopi, Zuñi, and Keresan pueblos but most closely resemble those found in Zuñi and Keresan pueblos.

More ornaments of shell were recovered from Higgins Flat Pueblo than from any other site in the Pine Lawn-Reserve area. This fact suggests an expansion of trade during the Tularosa Phase with the Hohokam or with peoples living near the Gulf of California.

Weaving tools of bone occurred likewise with greater frequency than in any other site in the Pine Lawn-Reserve area; and this suggests a greater interest in weaving.

Since approximately two-thirds of the basic tool-types had been used for at least 1200 years, and since the majority of the pottery types may be assigned to the Brown Ware tradition, we suggest that the culture of this pueblo in the Tularosa Phase remained essentially Mogollon in character. Influences from and linkages with cultures to the south and west (Hohokam and Salado) are strong (Brown Ware pottery, the majority of the tool-types, and the plant assemblage). To put the matter in another way, the Mogollon culture at about A.D. 1000–1250 is oriented more to the areas immediately to the south and west of the Reserve area. We feel safe in stating this, despite some Anasazi diffusion into the Reserve area.

SYNTHESIS

Mogollon Cultural Ecology—A.D. 1200

The Mogollon culture (2500 B.C.–A.D. 1000) of the Pine Lawn Valley-Reserve areas has sometimes been dubbed "marginal"—with the possible implication of "backwardness."

In view of what we now know concerning that culture in our area, I should say that throughout their history the ecological adaptation of these people was remarkable, and that their general level of cultural attainment was above average.

The geographical environment was pleasant but the area is and probably was climatically marginal as far as agriculture was concerned. The Indian attempted to make progress by controlling the natural forces about him—as best he could. One of the few controls within the grasp of the Mogollon Indians of A.D. 1200 was growing maize, beans, and squash and controlling and improving the types by selection. This is a limited control, to be sure. Since rainfall is not amenable to man's wishes (even with the aid of iodide crystals or dry ice) and ditch irrigation was difficult (in the Pine Lawn-Reserve area) because of the nature of the country, the only controls that man could exert over nature lay in the improvement of the strains of maize. By achieving a type of maize that matured rapidly and was resistant to heat and drought, these Indians could ensure a more stable food supply. In addition, the erection of houses to ward off the elements and to establish a safe place in which to store seeds and food for the morrow; the knowledge and use of fire for warmth, cooking, and health; and the fashioning of clothing for bodily protection constitute the few ways in which our Indians could strive for power and progress by controlling the natural forces about them.

But water was the single most important factor in the life of these people; and precipitation, plus frost-free days, plus skill, and plant adaptation and cultural preferences for certain types of crops determined where he could successfully live (Carter, 1945, pp. 84–108). The hard summer rains are often dramatic and impressive, but actually the run-off is very quick. The sun breaks through the clouds, and with the aid of the wind, quickly evaporates much of that which has fallen.

Precipitation is a function of altitude. The higher elevations therefore always receive more moisture than the plains around them, but, unfortunately, those well-watered, high areas are and were useless to farmers.

The Pine Lawn Valley-Reserve area ranges from 5,800 feet (Reserve) to about 6,800 feet (Tularosa Cave) in elevation. Ponderosa pine, juniper, pinyon, and live oak are the trees of the area.

The best statement of the geomorphology and the climate of our area was written by Dr. Ernst Antevs and published in our report

on Cochise and Mogollon sites (Martin, Rinaldo, and Antevs, 1949). I quote some of his pertinent paragraphs because the data given have an important bearing on subsistence and the relationship of the Mogollon culture to the environment.

GEOMORPHOLOGY

The geography and topography of the Pine Lawn region are shown on the Reserve Quadrangle of the United States Geological Survey and on the Forest Service map of the Apache National Forest.

The Pine Lawn Valley is from three to four miles wide and some ten miles long, and extends in a southwest-northeasterly direction between the San Francisco and the Saliz mountains, which are 8,000 to 9,000 and 7,000 to 7,500 feet high, respectively. The valley ranges from 6,000 to 7,000 feet in elevation, has a midway divide at about 6,350 feet, and is drained to the San Francisco River by small intermittent streams that flow through deep and narrow canyons at both ends.

The geology does not seem to have been studied, but judging from contiguous areas, namely, the Blue River region (Darton, 1925, p. 261), the Mogollon Mountains (Ferguson, 1921, p. 174), and the western San Augustin Plains district (Powers, 1941, pp. 209–211), the bedrocks probably consist of Tertiary igneous and sedimentary rocks. Road cuts and erosion bluffs expose siltstones, sandstones, and conglomerates. Terraces and mesas are capped by basalt beds. The stone artifacts left by the Indians consist of granite, trachyte, tuff, limestone, sandstone, quartzite, flint, etc.

The young valley deposits range from clay to bouldery gravel and their observed thickness varies from a few feet to more than 25 feet. When thoroughly dry, some beds are firmly cemented.

The Pine Lawn Valley lies on the transition between the Colorado plateau and the Basin-and-Range geomorphic provinces. Thus Fenneman (1931, map, pp. 274–276, 326–328, 380–382, 389) tentatively placed the boundary between the two provinces on 33° 40′ N. Lat., at the Arizona-New Mexico state line, and at the base of the San Francisco, Dillon, Apache, Mangas, and Horse mountains, while Lobeck (1939, p. 528; with Hinds, 1943, pp. 141, 189) included in the plateau large additional lobes of mountainous land to the west and to the east of the San Francisco River as well as the upper reaches of this stream and its tributaries down to a point that cannot be exactly determined from his small-scale map. Because of the approximately horizontal rocks and the deep and narrow canyons, the Pine Lawn Valley as well as the Saliz and Brushy mountains should probably be included in the plateau province.

MODERN CLIMATE

The climatic data of the greater Reserve region are summarized in "Climatological Data" (U. S. Weather Bureau, Bull. W, 1930, sec. 29), in "Climate and Man" (U. S. Department of Agriculture Yearbook, 1941, pp. 761–772, 1011–24), and in H. V. Smith, "The Climate of Arizona" (University of Arizona Agricultural Experiment Station, Bull. 197, 1945).

There are no temperature records for the Pine Lawn Valley or the immediate vicinity, but the significant temperatures have been calculated. To obtain them

the temperatures for Alpine in Arizona and for Luna, Alma, and Cliff in New Mexico were reduced to sea level by adding 0.22° F. for every 100 feet of altitude above sea level to the January values, and 0.36° per 100 feet to the summer values (Landsberg, 1941, p. 120). Then the sea level temperatures at Pine Lawn were interpolated and the probable temperatures there calculated by subtracting the temperature reductions for 6,130 feet elevation.

The calculated basic temperatures for Pine Lawn are given in Table 1. The average temperatures for January, July, and the year are 32°, 68°, and 49° F., respectively. The mean annual range, or the difference between the average temperature of the warmest and the coldest month, is 36°. The average daily temperature variation ranges between nearly 34° in August and 44° in June.

The winters (December, January, February) have on the average cold nights and cool to mild days, but, judging from the absolute maxima and minima for Luna and Alma, temperatures of −20° and +80° can be expected, this being the season of the greatest variability of temperature.[1]

The summers (June, July, August) have a mean temperature of 66° F., but with the large daily temperature variations the nights are mostly cool, the days warm to hot. More significant therefore are the average summer maximum of 85°, the average summer minimum of 47°, and the averages of these figures and of the summer mean of 66°, that is, the mean summer day temperature of 76° and the mean night temperature of 57°. Temperatures near or below freezing, and about 100°, can be expected during all parts of the summer.

Perhaps the most important temperature feature is the amount of the daily range, which averages 44° in June and about 34° in July, August, and January, and thus is one of the largest measured in the Southwest (cf. Kincer, 1928, p. 25; Smith, 1945, p. 68; Visher, 1946, p. 594). This extraordinary difference between the day maximum and the night minimum is mainly a consequence of the exceptionally dry air and clear sky, which let through high percentages of the solar radiation by day and of the outgoing earth radiation by night. It may be partly a result of low-altitude temperature inversions, that is, nightly formation close to the earth of a layer of air colder than the layers somewhat above the ground. Thus the radiation cooling by night may be increased by downflow of chilled heavy air from hills and plateaus into the valleys (Trewartha, 1943, pp. 29–31, 45–46), and the temperature maximum by day may be raised because the heating is confined to the thin air layer below the inversion level, which acts as a glass sheet and prevents the air from ascending and mixing (Haurwitz and Austin, 1944, p. 34).

The growing season is the time between the last killing frost in the spring and the first in the fall, and these generally occur with a minimum shelter temperature above 32° F. and sometimes as high as 40° (Conrad, 1944, p. 95). Because the length of this season varies considerably with local conditions, that at Pine Lawn can only be roughly estimated to last for about 120 days, or from the first of June to the end of September. It matches the growing season in northern New England and in northern Minnesota ("Climate and Man," U. S. Department of Agriculture Yearbook, 1941, p. 746).

[1] Temperature phases: Frigid temperatures, below 0° F.; cold, 0°–32°; cool, 32°–50°; mild, 50°–68°; warm, 68°–80°; hot, above 80°.

The precipitation records at some stations in the region surrounding the Pine Lawn Valley are shown in Table 2. By interpolations from these data the average annual rainfall at Pine Lawn has been determined at 15.5 to 16 inches, or slightly less than at Luna and 1.5 inches more than at Hood Ranger Station, a mile west of Reserve. The rainfall regimen is characterized by a dry season from April to June, a marked rainy season from July to September, a faint fall minimum, and a faint winter maximum. Eight inches, or 50 per cent of the precipitation, fall during the growing season, from June to September. Somewhat over 7 inches fall from July to September, leaving 9 inches for the remaining nine months. About one-third of the annual amount comes in the winter half-year, from November to April, two-thirds from April to October. The average annual snowfall is some 30 inches.

The 20 per cent heavier precipitation at Blue, fourteen miles west-southwest of Pine Lawn, shows that the Pine Lawn Valley lies in the rain shadow of the intervening mountains. Hood Ranger Station, located in the additional rain shadow of the Saliz Mountains, actually receives less summer precipitation than does Cliff, which is 1,368 feet lower.

Summer rains occur mostly as local showers accompanied by thunder and lightning. Most of them are probably caused by forced rise of moist air over hills and mountains. Winter precipitation results mainly from migratory cyclones coming from the Pacific off southern California.

With the exception of the San Francisco River and of short stretches below springs, the streams of the Pine Lawn Valley seem to flow only during periods of melting snow and heavy rains. In canyons and near the foot of the high San Francisco Mountains west and northwest of Pine Lawn seven springs are shown on the Forest Service map. During the dry July of 1947 the Wet Leggett spring, issuing just above the mountain foot, flowed uninterruptedly. At present its flow is artificially diverted just below the spring, but it re-enters the main arroyo one and one-quarter miles down the valley. The sediments in the small Wet Leggett Valley must be practically impervious, for a surprisingly large portion of the tiny flow passed the lower end of the valley at the abandoned old ranch, 2.2 miles below the spring, then sank into the stream bed. Below this point the bed was dry.

In Thornthwaite's classification (1948, Pl. 1) the climate is semi-arid, on the border of dry subhumid, and microthermal, and there is little or no water surplus in any season.

In comparison to Chicago, Pine Lawn has 6° higher temperature in January, 6° lower temperature in July, the same annual temperature, 12° smaller annual range, and more than twice as large daily range. Pine Lawn has one-half as much precipitation as Chicago, and the rainfall is decidedly more concentrated in the period from July to September. The growing season is 120 days as against 196 in Chicago. The most distinctive differences between the Pine Lawn climate and the Chicago climate are associated with the year round moisture deficiency and with the dry air and the clear sky, which promote relatively cold nights and relatively warm days, a large daily temperature range, throughout the year, and which cause frost late in spring and early in fall, and a short growing season.

In regard to dry-farming, the night temperature and the ground moisture in May-June, and the time of onset of the summer rains are particularly important.

The average conditions are rather unfavorable, which means that the actual conditions often are disastrous. Each factor or a combination of them can be decisive. Killing frosts may occur during any part of the summer, and chilly nights without frost are injurious, for instance, to corn. The ground moisture may be low at the arrival of spring, precipitation from April to June may be negligible, and the summer rains may be delayed. As a consequence, the growing season, dependent on adequate soil moisture and precipitation as well as on frost-free temperature, may be too short. On the other hand, some years are much better than the average figures and dates suggest.

It therefore deserves mention that maize is grown in Pine Lawn Valley at 6,150 to 6,350 feet elevation. During favorable summers a dwarf corn even matures at Luna at 7,050 feet altitude; but here maize has about reached its climatic limit, for it does not ripen every year, nor is it raised at all at Alpine at 8,000 feet. Similarly its limit is approached at Jewett Ranger Station, located twenty miles north-northeast of Reserve at about 7,400 feet, where mediocre corn crops are obtained during summers with a long frostless season and available moisture.[1] There are no temperature data for Jewett Ranger Station, but at Luna the average temperature of June, July, and August is 62° F., the mean night temperature of the same months is 52.5°, and the growing season is 100 days. At Alpine the corresponding figures are 59° and 50° and 78 days. Thus the regional lower limits of temperature and of length of season for maize are determined within narrow limits. These limits may be near the absolute ones, for "practically no corn is grown where the mean summer temperature is less than 66° F., or where the average night temperature during the three summer months falls below 55° . . . . The region of greatest production [of corn] in the United States has a mean summer temperature of 70° to 80°, a mean night temperature exceeding 58°, and a frostless season of over 140 days." (Jenkins, 1941, p. 310.)

It will be seen from these statements that if the climate at A.D. 1200 was the same as today, life in the Pine Lawn-Reserve area was somewhat precarious. Agriculture was practiced, for we found masses of corn cobs in Tularosa and Hinkle Park caves and burned corn and beans in Higgins Flat Pueblo. The crops may have been planted in or near river bottoms or at bases of hills so as to take advantage of arroyo run-offs. Thus, arroyo flood farming (Carter, 1945, p. 114) or flood water farming may have been the methods used for obtaining water for the crops; but in all likelihood, dry farming was also practiced. The disadvantages of using arroyo run-off or flood waters from the San Francisco or Tularosa rivers would be the danger of early frosts and of crops washed out or flooded by unseasonal or unexpected heavy rains. If dry farming were practiced, the farmers would be wholly dependent on the vagaries of the rainfall and would thus be confronted with occasional crop failures.

[1] The data on corn have kindly been supplied by Forest Supervisor R. B. Ewing and Forest Rangers Dean M. Earl and Robert L. Diggs.

But no matter where the Indians planted their crops they were living in an area in which average farming weather was unfavorable.

Even so, a disastrous year or so could have been borne since we have reasons for believing that the Mogollon farmers were thrifty and probably saved a generous portion of each harvest to tide them over a bad year.

These statements are all based on the assumption that the climate and distribution of annual rainfall at A.D. 1200–1300 was the same as today. But let us suppose that the rainfall pattern shifted slightly so that the precipitation in the winter and spring was less than it is now and that the summer and autumn precipitation was more. This condition would not produce an annual drought because the total average precipitation might be the same as today (about 14.5 inches). But a deficiency in precipitation in the winter and spring months would cause a deficiency of reserve moisture in the soil. And without moisture stored up in the soil, planting would have to be delayed until the advent of the rains in June or July. Such a delay would be disastrous, because then the number of frost free days would be too few for successful agriculture. I have observed, over a ten-year period, that if the winter and spring are dry, the winds tend to be of greater velocity, the desiccation is accelerated and the nights are excessively cold, with temperatures 5 or 6 degrees below freezing up to and even beyond June 15.

Thus, if the coincidence of moisture and temperature was not felicitous, the Indians would not be able to farm; and without farming the people would starve and the culture would collapse (Carter, 1945, p. 89).

Faced with this truly catastrophic predicament, the people would be forced to leave their homeland and seek another more favorable spot.

Now, as stated above, this is a supposition. We do not know why the people abandoned the entire San Francisco River drainage at about A.D. 1250 or 1300. Several guesses have been made, such as soil exhaustion, epidemics, the appearance of hostile groups (the Apache?) and drought. All or any one of these factors could cause a people to move. There is not much evidence on any of these suggestions except possibly the one dealing with hostile intruders. In some places near Reserve there are a few sites that appear to have been built on mesas that could have been easily defended. A few such villages may have been provided with a high, blank, outer wall, one or two defendable entrances, and a system of rooms, one or more

stories in height, that all faced inward (Danson, 1952). Such "fortified" sites strongly suggest that the people had to protect themselves from some marauding group; but such villages may have been the result of a shift in the distribution of the annual precipitation pattern, which in turn produced hungry neighbors. In other words, a shift in the pattern of rainfall caused hardship on everyone in the blighted area; and the few people who were lucky enough to have found an isolated water supply (a spring or streamlet) were able to remain a few more hazardous years in the area by building a village-stronghold.

But the important element in this whole situation might have been too little rainfall in the winter and spring months—a shift in the distribution of rainfall. Such an alteration might then bring in its train many other disasters—retreat of forest, denudation of ground cover, arroyo cutting, epidemics, and finally hungry citizens who might have been driven to extreme measures.

There is no evidence at present for this kind of climatic change —and thus most of this discussion is purely hypothetical.

Configuration of Mogollon Culture

In the earliest stages of the Cochise-Mogollon culture, food-gathering plus some hunting was the subsistence pattern.

Some time after 2000 B.C. the principal subsistence came from maize, beans, and squash. From that time up to about A.D. 1300, farming was the basic economy, with hunting and some gathering of wild foods and herbs to supplement the agricultural products. It is interesting to note that at about 2000 B.C., according to Antevs (Martin, Rinaldo and Antevs, 1949, p. 56), the climate of our area became relatively cool and moist and thus more favorable for farming.

If one were to examine our previous reports and were to look at and to compare the frequencies of projectile points and of milling stones, one would receive the impression that hunting played a major role in the Mogollon subsistence pattern and agriculture and gathering of wild foods a minor one.

However, since excavating six caves, two of which contained cliff-houses, we are fairly certain that agriculture provided the major part of the Mogollon food supply, especially after 300 B.C. From one cave alone (Tularosa) we shipped home 38 cartons (14 x 14 x 14 inches) of vegetable materials and only six cartons of the same size of

unworked animal bones. Of course, it might be argued, this is not a fair comparison because the Indians might have tossed the bones out of the cave and saved only the odds and ends of vegetable materials. We think the comparison *is* fair, however, because animal bones are few in number from any of the sites we have excavated and stripped. Even the trash mound at Higgins Flat Pueblo yielded relatively few "meat" bones.

The conclusion we draw from these data is that the culture rested basically on a farm economy. In the preceding paragraphs, I have tried to show how this economy was adapted to the environment.

Mogollon ecology, then, produced a configuration that is distinctive and yet part of the Southwestern Co-Tradition.

The pueblos of the Tularosa Phase (early) tended to be large (20–60 rooms), and were often located near or on rivers and streams or near springs. The relationship of this type of location to agriculture has been discussed above.

In our report on villages of the Reserve Phase (Martin and Rinaldo, 1950b, p. 568) we stated that from the time of the Pine Lawn Phase onward to and through the Reserve Phase population density was increasing. Beginning with the Tularosa Phase, the inhabitants began to draw closer together—to merge—with the result that villages were larger (more rooms and more square feet of building space per pueblo) but there were fewer sites.

On the basis of our surveys (Rinaldo, MS. unpublished) (Danson, 1952) we find a marked decrease in the number of pueblos assignable to the Tularosa Phase.

Rinaldo reports that for the lower Tularosa River and middle San Francisco drainages he found only 18 sites that could be assigned to the Tularosa Phase, whereas for the same area he found 50 sites belonging to the Reserve Phase. Danson (1952) also reports a sharp decrease of sites of the Tularosa Phase as compared with those of the Reserve Phase.

We are of the opinion that the population density may have been the same in the Tularosa Phase as in the Reserve Phase, but that the people of several towns had decided to band together and as a result towns were larger in size but fewer in number.

We can see no reason for postulating a change in the social organization (Martin and Rinaldo, 1950b, p. 568). If this assumption be correct, we would suppose that the social organization was the same

as that of preceding periods: matrilocal, extended families, with several extended families, related either by blood or through clan or ceremonial allegiance, living in one village, the total population of which might range from 60 to 300 persons; matrilineal descent and inheritance; monogamy; and lack of social classes.

The question of the association of kivas with Mogollon villages is somewhat difficult to answer.

In the sites of the Pine Lawn Phase, we found two larger pit-houses that may have been used for ceremonies (A, at SU Site; B, at Promontory Site); in those of the San Francisco Phase, we were unable to designate any building that may have been set apart for ceremonial functions; in sites of the Three Circle Phase, we came upon several structures that were larger and somewhat different from secular pit-houses (pit-houses C and K at Turkey Foot Ridge Village and Y at SU Site). In fact, houses C at Turkey Foot and Y at SU fit fairly well Smiley's definition of a kiva (Smiley, 1952, p. 22). In sites of the Reserve Phase, we found two rooms that may have functioned as ceremonial chambers (Room D at South Leggett Pueblo and Room A at Wet Leggett Pueblo), and one large rectangular subterranean room with a wide, eastern ramp entry at Saw Mill Pueblo (unpublished). This last structure does not fit Smiley's definition of a kiva, but nonetheless it was undoubtedly built for ceremonial purposes (dimensions approximately 10 by 8½ meters; two foot-drums or resonators in floor; roof supported by 4 very large posts). Another such rectangular kiva with a wide ramp entry was excavated by Dr. Chandler Rowe at Wheatley Ridge, near Reserve, New Mexico (MS. unpublished).

It has been assumed that kivas were not usually associated with Mogollon villages; but on the basis of this evidence, it seems fairly clear that religious rituals were just as important in the earliest Mogollon horizons as in the Basket Maker. As things now stand, rooms constructed primarily for religious functions are earlier among the Mogollon than among the Anasazi by several centuries.

According to Smiley (1952, pp. 20–23) the Great Kiva was one of the significant architectural features of the early Mogollon peoples, and the small round kiva developed from the pit-house in the Anasazi area.

On the basis of the present evidence, then, a religious structure was important to the Mogollon peoples as early as the first century before Christ (Pit-house A, Su Site) and to the Anasazi people as early as A.D. 800 (Great Kiva II, Site 1, Martin, 1939). Where the

Hohokam Indians conducted their religious ceremonies in the earliest time of their development is not yet known, but one might postulate that certain religious practices became popular about three centuries before Christ in the Cochise homeland (southern Arizona?) and spread northward from there. The essential ideas of crop fertility, rainfall, health, and tribal prosperity may have been retained by all the Southwestern peoples, but some of the less important features may have been modified or dropped, and embellishments and local variations of the basic pattern probably developed. The use of a special building for religious purposes may be part of the area co-tradition (Martin and Rinaldo, 1951).

The origin of the rectangular kivas found in the Reserve and Tularosa Phases is unknown, although we have some ideas on the subject. Such kivas occur in the Reserve area, in the upper Blue River area, at Point of Pines (Wheat, 1954, p. 61) and elsewhere in the western pueblo area. The rectangular kiva with a ramp entry may not have a wide distribution, although the actual dispersion is not at present known. Miss Elaine Bluhm excavated one at the Saw Mill Site, Pine Lawn Valley, during our 1952 season. In her forthcoming publication Miss Bluhm discusses the probable origin of these structures. In essence, she suggests that the shape and special features may be of Mogollon origin, although the masonry may be a trait borrowed from the Anasazi. Perhaps the later type of rectangular kiva similar to that at Point of Pines (Smiley, 1952) is related to these ramp-entry structures. The late kivas at Point of Pines seem to resemble those in prehistoric Hopi villages (Smiley, 1952), while those in the Tularosa Phase (Higgins Flat Site) in the Reserve area may be more like prehistoric kivas in the Zuñi area.

This Zuñi resemblance brings me to my next point. This point is concerned with the Mogollon and Anasazi traditions and their blending.

At or about A.D. 700 one finds, near Quemado, New Mexico, many features typical of the Anasazi culture plus some Mogollon ceramics.

At the same time, in the Reserve-Pine Lawn area one finds typical Mogollon settlements in which occur a few Anasazi traits. From this time on some traits were being passed from one group to the other.

At about A.D. 1000 a significant diffusion-acculturation-migration occurred. This was probably not the type discussed by Willey (1953), although some aspects of these exchanges were similar.

Up to about A.D. 1000 the Mogollon people of the Upper San Francisco River area had lived in pit-houses and had made brown and red-on-brown pottery. Some time near the beginning of the eleventh century the pit-house tradition was abandoned and surface, multi-room houses became the house type of the area. The walls of these houses were built of stones and the rooms, two to six in number (in the earliest part of this period), were contiguous. At the same time, black-on-white decorated pottery replaced entirely the red-on-white or red-on-brown (Mogollon) pottery. We have discussed these changes in detail in all of our reports since 1945.

The mechanics of this shift has not been and still is not entirely clear to us. But we are of the notion that ideas or people or both peacefully penetrated the Pine Lawn Valley-Reserve and adjacent areas from the north. We have no evidence that any force was employed. Except for the change in house and major painted pottery types, and settlement patterns (contiguous rooms) and larger aggregations of people per village, there is no sharp cleavage with the past. There was no sudden interruption of old traditions nor any sign of invading forces. We have the impression that a few of the Anasazi people from the Zuñi-Quemado area may have moved into our area peacefully and may have lived for a short time alongside the pit-house dwellers. Then the Mogollones abandoned some of their time-honored ways and adopted a few new ones from the newcomers. It should be remembered that the newcomers, if there were such, were already acquainted with some Mogollon traditions for some diffusion had been going on between the two cultures for several centuries. If there was no actual migration of the peoples into the Reserve area certainly there was an influx of Anasazi ideas. It seems most likely that an actual migration occurred.

At any rate, a "blend" or "hybridization" took place. Most of the older Mogollon traditions continued—traditions such as types of tools and all culinary wares (plain and textured brown wares) and smudged wares. Even the "public" buildings, such as religious structures, may have been essentially Mogollon.

The success of this diffusion-acculturation may have been, then, partly due to the fact that the two cultures—Mogollon and Anasazi—participated in a similar cultural tradition or co-tradition and a common economy and geographical background.

What caused this diffusion-acculturation to occur is not known. The two factors that come most quickly to mind are climatic change and/or an influx of hostile people. These possibilities have been discussed above.

The phases following this blend—the Reserve and Tularosa—apparently were stable and were composed of a well-integrated mixture of a few Anasazi and a majority of Mogollon traits. The acculturation must have been rather swift. We have no absolute dates for these events, but from the available evidence, the intermixture and resultant merging may have taken place within a few decades—at the most three or four.

Unfortunately, not long afterwards, perhaps A.D. 1250–1350, the people left this entire area and we are unable to observe further developments in the area.

Summary of Mogollon Cultural Ecology

Population density, size and distribution of villages, social and economic organization depended on the natural environment and the subsistence habits of the people. Climatically the natural environment was probably marginal as far as agriculture was concerned; otherwise the environment was more or less a constant, but it also possessed some of the attributes of a variable in that precipitation, frost-free and sunny days varied from time to time.

The people were self-sufficient, although a limited amount of trade was carried on, especially after A.D. 1000.

Under the economy practiced by the Mogollon people, individual families would have had difficulty in surviving. The extended family was apparently an efficient and self-supporting economic unit. All phases of agriculture could be carried on better by many workers than by one or two. This would be especially true after some specialization developed. Pottery-making; weaving of textiles, sandals and the like; wood-working; the art of masonry; hunting; and the conducting of religious and religio-medical ceremonies were all limited types of specialization and all consumed some time. Therefore, many hands would make planting and harvesting pleasanter and easier. Large clusters of rooms, then, probably mean a fairly constant and ample food supply. This, the people of Higgins Flat Pueblo undoubtedly had. It is not necessary, perhaps, to point out that these people were always living close to the limit of survival and that several seasons of unfavorable weather would make village life and extended families impossible.

We conjecture that some of the social determinants that bound the villages together were agriculture, ceremonies, and kinship.

Elsewhere, we have discussed the family and property in the Reserve area (Martin and Rinaldo, 1950b, pp. 564–569). We have

no data on which to base any inferences concerning marriage, political organization, or chieftainship. We assume that there must have been some organization or leadership because towns during the Tularosa Phase were sizable. Therefore, it seems probable that common interests and the common weal would cause submission to a central authority, especially in regard to community building projects, planting, harvesting, and group rituals.

The ecology of the Mogollon Indians of A.D. 1200 permitted a mildly dense population and they tended to cluster in pueblos of moderate size partly because of ceremonies, agricultural practices, and house-building habits, although these may be looked upon as the result of cultural historical factors of great antiquity. The earliest settlers tended to live in clusters for protection (Pine Lawn Phase) against some wandering hostile bands, and this grouping was likewise convenient for food-gathering, for agricultural subsistence, and for ritual patterns. The adaptation of the Mogollon Indians from the earliest time (perhaps 2500 B.C.) to the time of abandonment of the area (about A.D. 1250–1300) may be characterized as a successful one.

What factor or factors forced the people to withdraw and where they went are questions yet to be answered.

The orientation of many Mogollon cultural traits at about A.D. 1200 (tepary beans, cotton, the majority of characteristics of the corn; paint palettes, carved and cut shell, the three quarters grooved ax, and the style of carving in stone) is towards the South and West (the Hohokam and Point of Pines areas). The textile fragments resemble those found in the Anasazi area of the Classic Pueblo horizon.

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